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JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

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GAS PURIFICATION
BY
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From ½ to 40 H.P. ind.
See Advertisement in last week's JOURNAL, page 862.
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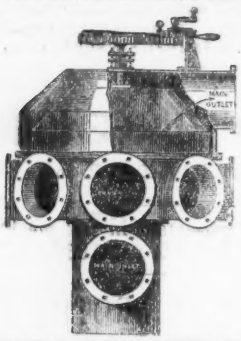
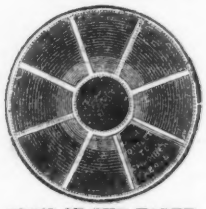
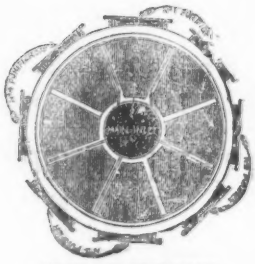


ELEVATION OF THE CENTRE-VALVE.



PLAN OF THE VALVE.



PLAN OF THE BODY.

These PATENT CENTRE-VALVES are the most perfect and certain means for working Purifiers on the system of three in action, and one out of action. The Valve itself is protected from all injury inside the safety cover. The working of the Valve is so easy, and so governed by the stop-catch movement, that the Purifiers can be instantaneously changed in the dark as well as in daylight. They are scraped perfectly true, metal to metal, the facings heretofore exposed are always covered, and there is nothing more reliable, certain, and durable in a gas-works. By their use the floor of the Purifying-house is clear and level; the Valve and all connexions being beneath the floor, out of the way of working. A considerable improvement and saving is effected in the cost of the connecting-pipes.

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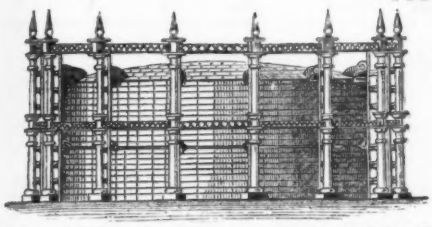
Most Effectively and Economically restores this waste *ad infinitum*.

The Patentee having devoted more time and attention to this subject than perhaps any other person living, is now in a position to recommend the adoption of this process to Gas Companies and Corporations with the utmost confidence in its practical utility, convenience, and economy. 1st. It restores the spent Lime at from one-third to one-half its original cost, apart from its undoubted convenience and the economy of space. 2nd. There is practically no limit to the duration of the Lime. 3rd. The cost of apparatus for the introduction of the process is very moderate and exceedingly durable. 4. The Patentee supplies special bricks and castings, erects and proves the process on the most favourable terms.

The process, in operation, may be seen at the Corporation Gas-Works, Paisley, where the Lime has been restored 120 times. Inspection is cordially invited.

For Terms, apply to GEO. R. HISLOP, F.C.S., Engineer, Gas-Works, PAISLEY, N.B.



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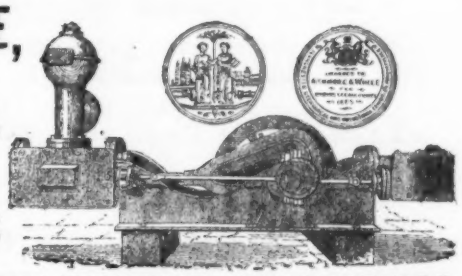

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Also of the "SLIDE-VALVE" STEAM-PUMP,

For Water, Tar, Grains, Soap, Thick Fluids, Chemical, Gas, or Iron Works, Mines, Breweries, Ships, &c.

No possibility of Valves sticking, as they are actuated by positive motion from an eccentric.

LIVESEY'S PATENT WASHER.

This apparatus effects the most intimate contact between the liquor with which it is supplied and the gas passing through it, resulting in the complete removal of all particles of tar, increasing the ammonia strength of the scrubber and condenser liquor, and removing a large proportion of other impurities—notably, carbonic acid. The Washer is intended to work in conjunction with a scrubber. It occupies little space, and is inexpensive. It does not become clogged with tar or corroded by the action of the liquor or gases, it gives three inches of pressure, and only needs a supply of liquor to keep it in regular action without any further attention. It has been in constant successful use for five years, and is now in operation in upwards of fifty places.

Prices, fitted and fixed complete, exclusive of Valves and Connections; all foundations and unskilled labour required in erection to be provided by the Gas Company:—

Quantities to pass in cubic feet per 24 hours	100,000	250,000	500,000	750,000	1 million	1½ million	2 million	3 million	4 million
Price each	£30	£50	£70	£95	£120	£165	£200	£280	£360

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INVITE THE ATTENTION OF GAS COMPANIES AND OTHERS FOR THE SUPPLY OF

EVERY DESCRIPTION OF GAS APPARATUS.

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NEW GAS-WORKS erected complete. Plans and Estimates furnished. MAINS, METERS, SERVICES, LAMPS, &c., adapted for Towns of any size. Gas Companies advised on Improvements, Extensions, and Alterations of Works.

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They beg special attention to the excellence and superiority of their WET and DRY METERS, several thousand being now in use by many of the largest Gas Companies in the West of England and South Wales. Warranted to measure correctly, and not to vary. Their acknowledged superiority has brought them into general use more rapidly than any Meters hitherto manufactured. A guarantee of Five years tendered with each Meter.

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An extensive variety of Choice Designs in CHANDELIERS, PENDANTS, BRACKETS, STAR and SUN LIGHTS. MEDIÆVAL FITTINGS for CHURCHES, &c.

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WEST'S GAS IMPROVEMENT COMPANY.

LIMITED.

ARE NOW PREPARED TO SUPPLY AND ERECT THEIR PATENTED MACHINERY FOR

CHARGING AND DRAWING GAS-RETORTS,

And to enter into arrangements with GAS COMPANIES for its use upon moderate terms of Royalty.

The Patented Machinery has secured the approbation of all Engineers who have visited the MAIDSTONE GAS-WORKS, *where it is in full operation, and may be inspected at any time on application to the Manager.*

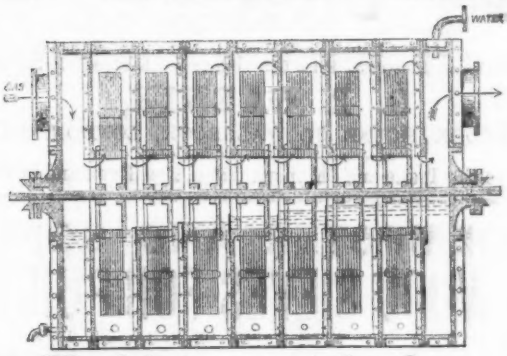
The advantages attending its use are—

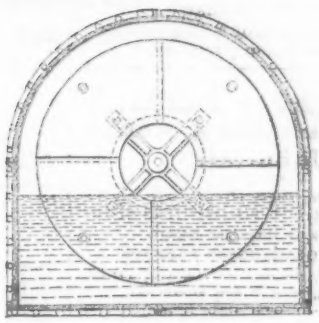
INCREASED VOLUME OF GAS PER TON.—INCREASED YIELD PER RETORT.—INCREASED BULK OF COKE FOR SALE.—REDUCTION IN LABOUR AND LESS DEPENDENCE ON SKILLED STOKERS.

A Pamphlet containing a description of the Machinery, and Copies of Reports on the working of the same, &c., will be forwarded on application to the MANAGING DIRECTOR, Maidstone. Communications may also be addressed to the Consulting Engineer, R. P. SPICE, Esq., M. Inst. C.E., 21, Parliament Street, London, S.W., or to the Engineer and Analyst, F. W. HARTLEY, Esq., A. Inst. C.E., 55, Millbank Street, London, S.W.

KIRKHAM, HULETT, & CHANDLER, LIMITED.

PATENT "STANDARD" WASHER-SCRUBBER COMPANY.





These Machines contain from 3200 feet to 65,000 feet of Wetted Surface.

The Special Merits of this Washer are as follows:—That it is not necessary to reduce the temperature of the gas to 60°, or thereabouts, to make it effective; and that as no tar is retained in it, the illuminating power is not reduced as in Tower Scrubbers. That the distribution of the liquor is made with unerring regularity. That it occupies very small space, so that it can be, at little expense, effectually protected from extreme changes of the weather. That the considerable expense of Coke or Wood, or other Scrubbing Material, is entirely saved, and that the great nuisance and cost of from time to time replacing the Scrubbing Material is avoided. That, by the revolution of the discs, the quantity of water carried up by them, and tending continuously to fall, exposes a very large amount of fresh wetted surface to contact with the gas as it ascends. That it is particularly adapted for Gas-Works where Sulphate of Ammonia is manufactured. That it is much cheaper than any other Scrubber that will do the same amount of work effectually. That it is the only Washer suitable for purifying Gas from all its impurities by solution. That it works with a minimum of pressure. That it takes out every trace of Ammonia from the Gas in once traversing the machine, as well as a very large quantity of carbonic acid and sulphuretted hydrogen. That it requires very little outlay for foundations.

The following Testimonials show the opinion of eminent Engineers as to the capabilities of the Washer:—

MESSRS. KIRKHAM and HERSEY. *The Gaslight and Coke Company, Beckton, North Woolwich, June 8, 1880.*

Gentlemen,—I enclose you some particulars of the working of your Washers here, and I intend having some more experiments made, as just now we are working the first Washer with liquor and the second with water. Of course the fact of our having ordered two more, in addition to the four which we have in use, is a sufficient indication of my opinion of the value of the Washer.

(Signed) G. C. TREWBY.

MESSRS. KIRKHAM, HULETT, and CHANDLER. *The Gaslight and Coke Company, York Road, King's Cross, Jan. 14, 1879.*

Gentlemen,—In reply to your inquiry, I am pleased to say the Washer which was put in action at this station in October last has quite fulfilled my expectations, as it confirms the experiments I made in May last with the smaller machine. Working at four revolutions per minute, it takes out every particle of Ammonia, while purifying more Gas than it was intended to do. I enclose particulars of a week's working during our heaviest make, by which you will see that it yields the full quantity and strength of liquor, and works with little pressure. I am therefore quite satisfied with the machine, and trust it may meet with the success it deserves.—I remain, &c., (Signed) JOHN CLARK, Engineer.

The following Table shows the results of the working of one of these Washers, lately erected to purify 60,000 feet of Gas per Hour, at the St. Pancras Station of The Gaslight and Coke Company:—

1879.	Nos. of the Divisions and Strength of Liquor in each.										Water used per Ton of Coals.	Gas Purified per Hour, Cubic Feet.	Ammonia on Outlet.	Temperature.			Pressures.		Revolutions per Minute.
	1	2	3	4	5	6	7	8	9	10				Inlet.	Outlet.	Atmosphere.	Inlet, Inches.	Outlet, Inches.	
	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.									
January 7	11	9	7	5½	3½	3	1½	1½	½	0	10 Gallons.	59,000	Nil.	74°	66°	31°	23	23½	5
" 8	9½	7½	6	4½	3	2	1	½	½	0	10 "	78,000	Nil.	73°	61°	31°	28	28½	4½
" 9	11	9	7	5	3½	2½	1½	1	½	0	10 "	82,000	Nil.	74°	67°	38°	27½	28½	5
" 10	10½	8½	6½	5	3½	2½	1½	1	½	0	10 "	66,000	Nil.	76°	64°	28°	28	27	5
" 11	12½	10	7½	5½	4½	3½	1½	1	½	0	10 "	61,000	Nil.	73°	64°	27°	26	25½	5
" 12	11	8½	6½	—	—	—	1½	½	½	0	10 "	39,000	Nil.	74°	64°	27°	26	25½	5
" 13	13	10½	8½	6	4½	3½	2	1½	½	0	10 "	78,000	Nil.	73°	65°	42°	28	26	5

MESSRS. KIRKHAM, HULETT, and CHANDLER. *Corporation of Birmingham, Gas Department, Saltley Works, May 23, 1879.*

Gentlemen,—I beg to enclose you a copy of the results of the tests which, by the kind permission of the Engineer, Mr. Clark, I made on the 6th of March last, of the working of one of your "Standard" Washers and Scrubbers at the St. Pancras Station of The Gaslight and Coke Company, and I am of opinion that, for an apparatus occupying so small a space, they are exceedingly satisfactory.—Yours truly, HENRY HACK, Engineer.

Working Results obtained from KIRKHAM, HULETT, *and* CHANDLER'S *Patent "Standard" Washer and Scrubber at the St. Pancras Station of The Gaslight and Coke Company, London, March 6, 1879.*

Gas passing per Hour, Cubic Feet.	—	Impurities in Gas per 100 Cubic Feet.			Temperature.		Pressure in Inches.	Revolution of Apparatus per Minute.	—	No. of Divisions and Strength of Liquor.										Water Used during Experiment. Gallons.
		SH_2	CO_2.	Grains. NH_3.	Washer.	Air.				10	9	8	7	6	5	4	3	2	1	
64,000 {	Inlet	2·00	2·00	158·8	72	57	21	4	Twaddel deg. at 60°	5·3	4·9	2·85	2·35	1·7	1·05	0·6	0·3	0·15	0·1	63
	Outlet	1·50	1·50	0·8	68	57	20		Acid, ounces.	11·0	8·4	6·3	4·5	2·7	1·7	1·3	0·7	0·3	—	

MESSRS. KIRKHAM and HERSEY. *The Leeds Corporation Gas-Works, Meadow Lane, Aug. 14, 1879.*

Gentlemen,—In reply to your inquiry of yesterday's date, I have pleasure in stating that the item appearing as income derivable from Ammonia in my estimate of revenue for current year is not an exaggeration. Our average income from Ammonia is 2s. 8d. per ton of coals carbonized, but at the works where your invention is in use we derive not less than 3s. per ton. Since the introduction of efficient Scrubbers at our works the greater yield of this product (now twice as valuable as coke to us) is such that the cost of Apparatus for its extraction can be wholly paid for out of from nine to twelve months gains. I am, Gentlemen, yours faithfully, (Signed) H. WOODALL, Engineer.

MESSRS. KIRKHAM and HERSEY. *Heywood Local Board Gas-Works, Hooley Bridge, Heywood, Dec. 1, 1879.*

Gentlemen,—In reply to your favour of the 28th ult., I beg to state that the Scrubber is at work, and doing well. I shall be glad to show it to any inquirers.—Yours truly, (Signed) EDWIN BUCKLEY, Engineer.

MESSRS. KIRKHAM and HERSEY. *Phœnix Gaslight and Coke Company, Office, Greenwich, S.E., Dec. 19, 1879.*

Gentlemen,—In accordance with my promise that I would inform you as to the working of the "Standard" Washer erected by you here in June last, I now write to say that we are passing through it 100,000 cubic feet per hour (the quantity for which it is made) direct from the Condensers, "bye-passing" the whole of our Scrubbers, which, not being needed, have been standing still since the "Standard" Washer was put in use. It seems as though the Washer more effectually removed the Ammonia when taking the full quantity of gas than less; as, at the present time, at the sixth chamber (there being eleven in all) not a trace can be discovered either by turmeric or acid litmus paper. The difference in pressure between inlet and outlet is only ten-tenths of an inch. I need scarcely say, after the above, how perfectly satisfied I am. (Signed) P. J. WATES, Engineer.

For further particulars and testimonials, address Messrs.

KIRKHAM, HULETT, & CHANDLER, LIMITED, { 59 & 60, Palace Chambers, Bridge St. Westminster, London, S.W.

C. & W. WALKER'S
WOOD PURIFIER SIEVES,

Which have now been used for fifteen years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.

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FIRE CLAY and BRICK WORKS,
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Proprietors of
BEST GLASS-HOUSE POT and CRUCIBLE CLAY.
Manufacturers for Home and Export.
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BLAST-FURNACE, TANK BRICKS, LUMPS, TILES,
And Every Description of Best Fire-Bricks.

TROTTER, HAINES, & CORBETT,
BRETTELL'S ESTATE
FIRE CLAY & BRICK WORKS,
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Manufacturers of GAS-RETORTS, GLASS-HOUSE FURNACE & BLAST-FURNACE BRICKS LUMPS, TILES, and every description of FIRE-BRICK.
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BEST GLASS-HOUSE POT and CRUCIBLE CLAYS.
SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

ESTABLISHED IN 1860.
BENJAMIN CARPENTER,
THE ORIGINAL MANUFACTURER OF THE IMPROVED
WOOD SIEVES
FOR
GAS PURIFIERS & SCRUBBERS.

PROVIDENCE WORKS,
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LONDON, N.

The Dunston Engine Works Co.,
GATESHEAD-UPON-TYNE.
Are the Sole Manufacturers of
Archer's Patent Hoists,
ALSO OF
Archer's Patent Stone Breaker,
AND OF
Archer's Patent Ore Crusher & Pulveriser,
The last-named Machine (without the Pulveriser) makes the best and most durable Coke Breaker.

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Patent Gas Calorigen,
A STOVE FOR
WARMING AND VENTILATING.
RECOMMENDED BY DR. RICHARDSON.

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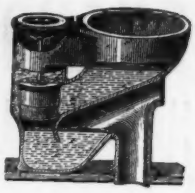

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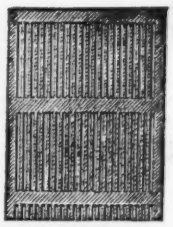
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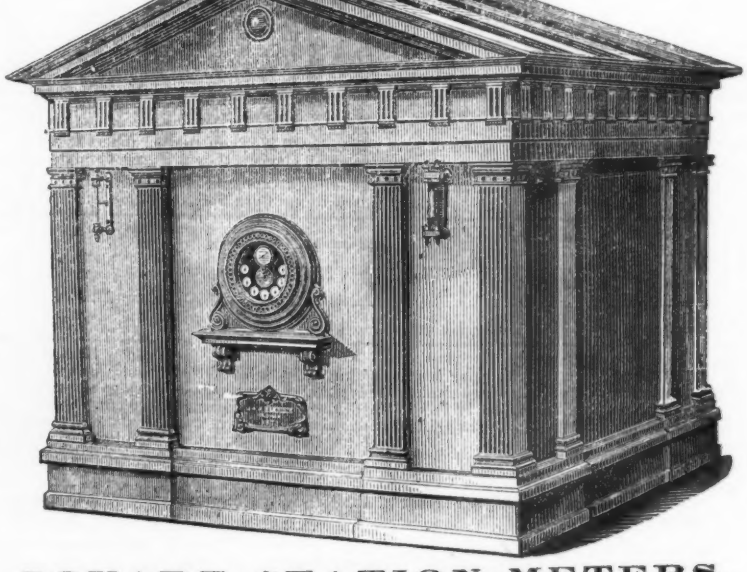

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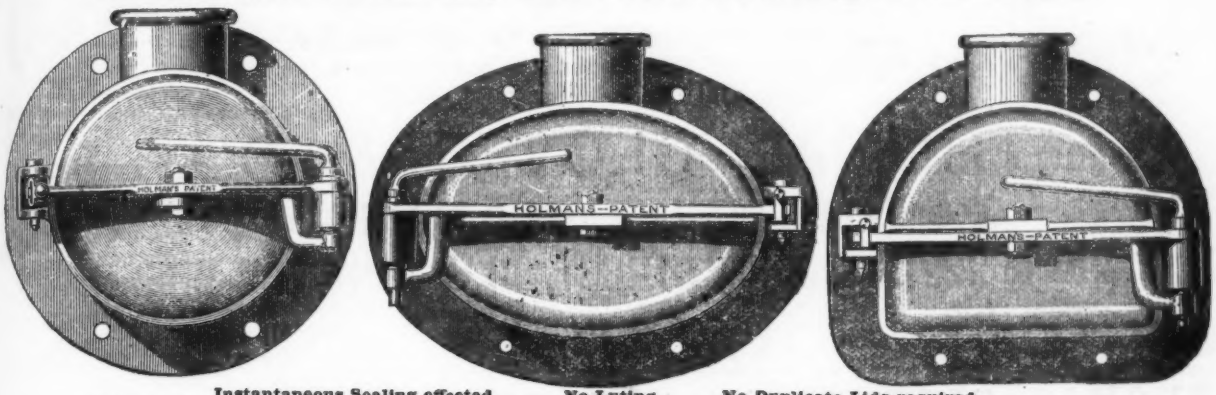


Instantaneous Sealing effected. No Luting. No Duplicate Lids required.
Holman's New Self-Sustaining Cross-Bar ensures freedom of Joint, and maintains parallel position of the Lids.

Morton's Patent Retort-Lids are in use in nearly all the Principal Gas-Works in the United Kingdom and the Colonies; also on the Continent and in the United States of America. They are now made of the

SAME FORM OR SECTION AS THE RETORT. (See Illustrations above.)

Engineers preparing Specifications of New Works will be furnished with Dimensions of Stock Patterns, together with Approximate Weight and other data on application.

HUNT'S
EQUILIBRIUM DIRECT-MAIN GAS GOVERNOR.

In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communications being avoided by placing the Lever or Radius Arm (shown in the drawing) inside the Valve-Chamber upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.

These Governors have been adopted by many leading Gas Companies, among whom are the following:—

The Gaslight & Coke Co. (19), The London Gas Co. (3), and at Abergavenny, Arundel, Birmingham, Cannes (France), Devonport, Dursley, Exeter, Guernsey, Haleowen, Leicester, Mentone (France), Monmouth, Newcastle-on-Tyne, Oxford, Plymouth, Rochdale, Windsor, &c.

TESTIMONIAL.

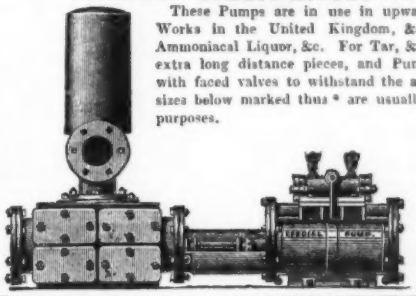
The Gaslight and Coke Company,
9, Water Street, New Bridge Street,
Blackfriars, E.C., Feb. 27, 1875.

MESSRS. TANGYE BROTHERS AND HOLMAN.

Gentlemen,—The two 24-inch and three 36-inch Hunt's Equilibrium Governors supplied by you, and fixed in the valve-rooms at Whitechapel, Goswell Road, and Blackfriars, are working very satisfactorily.

Yours truly,
(Signed) JOHN JOHNSON.

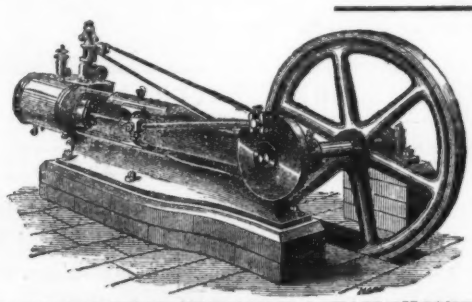
THE
"SPECIAL" DIRECT-ACTING STEAM-PUMP.



These Pumps are in use in upwards of one hundred Gas-Works in the United Kingdom, &c., pumping Water, Tar, Ammoniacal Liquor, &c. For Tar, &c., they are provided with extra long distance pieces, and Pumps are entirely of iron, with faced valves to withstand the action of the liquid. The sizes below marked thus * are usually kept in stock for these purposes.

The quantities delivered of Tar should be taken about two-thirds that of water.

Diameter of Steam Cylndr.	Diameter of Water Cylndr.	Length of Stroke.	Gals. of Water per Hour, Approx.	Prices for Water.	Prices for Tar and Ammoniacal Liqr.
*3 in.	1¼ in.	9 in.	450	£16 0 0	£17 0 0
*4 ,,	2 ,,	9 ,,	815	18 0 0	19 0 0
*5 ,,	2¾ ,,	12 ,,	1,250	21 0 0	22 10 0
*5 ,,	3 ,,	12 ,,	1,830	22 10 0	24 0 0
*6 ,,	3 ,,	12 ,,	1,830	25 0 0	26 10 0
*6 ,,	4 ,,	12 ,,	3,250	30 0 0	31 10 0
6 ,,	5 ,,	12 ,,	5,070	35 0 0	36 10 0
*7 ,,	5 ,,	12 ,,	5,070	40 0 0	41 10 0
7 ,,	6 ,,	12 ,,	7,330	45 0 0	46 10 0
*8 ,,	6 ,,	12 ,,	7,330	50 0 0	52 0 0
10 ,,	6 ,,	12 ,,	7,330	60 0 0	62 10 0
10 ,,	8 ,,	12 ,,	13,000	75 0 0	77 10 0



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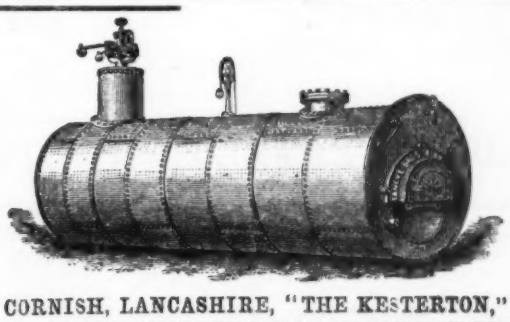
	£28	£37	£44	£68	£86	£111	£122	£133	£185	£215

Including Governor and Feed Pump. Variable Expansion extra.



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Also Makers of IMPROVED HYDRAULIC HOISTS, TRAVELLERS, CRABS, CRANES, PULLEY BLOCKS, HYDRAULIC AND SCREW LIFTING JACKS, LATHES, PUNCHING AND SHEARING MACHINES, And all other Descriptions of Tools, &c.

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Dublin, 1865.

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The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

Paris, 1867.

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3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

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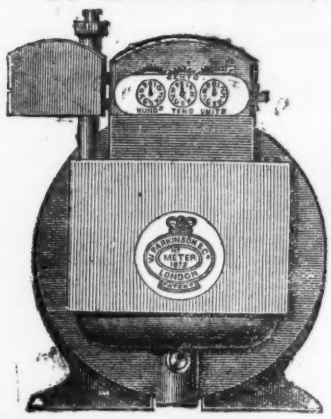

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STATION-METERS & GOVERNORS,

EXHAUSTER REGULATORS,

PRESSURE REGISTERS, EXPERIMENTAL APPARATUS, GAUGES, WATER-METERS, &c.

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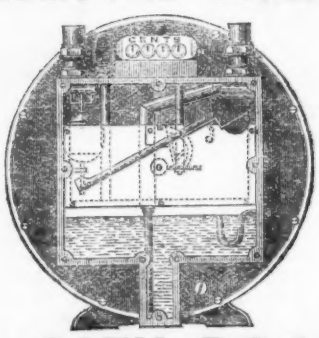
In this Meter, the action of the measuring-drum is reversed. By this arrangement an improvement is effected in the registration at high speeds, which, in many tests, has not varied from the smallest light to three times the capacity of the meter. It works equally well under all pressures. The range of error between the high and low line is much smaller than that allowed by the "Sale of Gas Act."



The Meter has been critically tested, and most favourably reported upon by official Meter Inspectors in London and Birmingham.

W. PARKINSON and CO. have made arrangements for the manufacture of these Meters, both in tin and cast-iron cases, and for the alteration of old ones to this principle, which is confidently recommended as possessing every quality that can be desired by Gas Companies, Corporations, or Private Consumers.

COTTAGE LANE, CITY ROAD, LONDON, E.C.

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TO CORRESPONDENTS.

R. G.—*Shall insert report next week.*

B. N.—*Will write you privately in the course of the week.*

W. B.—*At an early date we shall have pleasure in referring to your appliances.*

W. H.; G. and Co.—*Received.*

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, JUNE 15, 1880.

Circular to Gas Companies.

We anticipate special advantage to the British Association of Gas Managers from the election of the Acting President of the meeting just concluded, to the presidential chair for the ensuing year. The Inaugural Address which Mr. Hunt delivered more than realized the high expectations which had been formed in reference to it. It was, in regard to each of the many subjects with which it dealt, a most thoughtful and valuable review of the progress which has been made, and its interest and value were greatly enhanced by the evidences of original work which were apparent throughout. The address may be looked upon as the key-note for the meeting of 1881. Members preparing papers to be then read will try the harder to make them thorough and exhaustive, because of the example of the President, and we hope he may be gratified by seeing a continuance, if not an increase, of that independent research which he advocated, and which was conspicuous in the papers of this year.

It is in another direction, however, that we look for the special advantage to which we have referred as likely to result from the re-election of Mr. Hunt. In the usual course, after the President has delivered an address, in which he may have made suggestions likely, in his opinion, if carried out, to conduce to the advantage of the Association, he immediately retires from his office. His influence then ceases to be so great in applying these suggestions, and another does not take them up with the same heartiness or appreciation of their value, and so, for the time, they fall to the ground. In our issue of last week, we referred to the desirability of making use of the organization of the central and of the district Associations for the purpose of acquiring more exact information and data upon disputed or doubtful points in reference to gas manufacture. We were glad to find Mr. Hunt giving the weight of his advocacy to the same idea, and we are not without hope that, before he next meets the members of the Association, some more definite form may have been given to it, even if there is no actual fruit in the shape of a compilation by the Committee of returns obtained in accordance with it.

Mr. Hunt said: "It seems possible that we might with "advantage imitate the practice of kindred societies . . . "by the encouragement and prosecution of original research;" and further, "Do we not fail somewhat in our aims by not "giving, to a certain extent at least, point and direction to "the labours of the investigator, and by abstaining in our "collective capacity from all attempts at elucidating some of "the apparent mysteries of gas manufacture?" There seems a general disposition to respond affirmatively to this question, and if the Committee of the Association set themselves to the work of supplying the acknowledged omission, they will evidently find much ready co-operation among the members, and will greatly add to the claims of the Association upon all interested in the business of gas making. One of the main difficulties in the way of such concerted action on the part of the Committee appears to us to consist in the infrequency of their meetings. If it is the custom of the Committee, as we understand it is, not to hold any meeting after the annual assembly until April of the next year, the interval has been long enough to allow the impressions of the past meeting to be dimmed or forgotten, and the time to the approaching one is too short for the preparation for it of more than routine business. To "strike while the iron is hot" is often a great saving of labour, and a meeting of the Committee shortly after the general meeting would probably aid greatly such work as is suggested. We repeat that the re-election of Mr. Hunt furnishes an unusual opportunity of enlarging the operations of the Association, and we hope that it will be made the most of. One thing is certain, that if the President and Committee are in earnest, they will not want for loyal support and active co-operation from their Secretary, Mr. Bennett.

And now we may ask—What is the nature of the work which can fairly and properly be taken in hand by the Committee? what the nature of the investigations in which they may with propriety ask the aid of the members, and the Companies they serve, in prosecuting? Two proposals were before the late meeting—the one by the President, which we have quoted; the other by Mr. G. E. Stevenson, of Peterborough. The paper read by the latter gentleman advocated the preparation annually of an exhaustive analysis of the accounts of such Gas Companies as would furnish the necessary particulars, and the publishing of this analysis as an appendix to the annual volume recording the proceedings of the Association. This proposal received but little favour at the hands of those who discussed it. There was a general opinion that the information so collected would do little to help professional gas makers, while it would furnish weapons of attack upon individual Companies and their executive, to do which is certainly not the mission of the Association. It is very difficult, in any comparative statement of the kind, for those unacquainted with the local circumstances of each case to make deductions of a reliable character. Mr. Field's analysis of the accounts of the Metropolitan Gas Companies simply, presents contrasts and disparities so striking that they are hard to be understood even by those very well informed, and in returns collected over the wider area of the whole country the difficulty would be proportionately greater. Whatever value might attach to such returns, they would be of rather a mechanical character. There are already strong inducements to show good results in working, and especially large dividends; and there is reason to fear lest the pursuit of these objects should be followed with too eager a desire for the immediate return, and time and attention be grudged to the patient study of difficult questions, which, if solved, might amply well repay the effort. The discussion upon the paper, while unfavourable to the exact proposal which it made, yet showed that Mr. Stevenson had given expression to a very general feeling in advocating the use of the Association machinery for the ascertaining of facts and statistics upon points of general professional interest. There was, we believe, no exception among those who took part in the discussion; all alike recognized the value of the work that might be done, and desired that the effort should be made to realize it.

Returning, then, to the first proposal—that of encouraging research into doubtful questions—it only needs that the track should be marked out, and it is evident there will be no lack of eager and intelligent travellers upon it. Neither will there be lack of occupation, for the number of moot points among gas engineers is very large. For instance, there is a great difference in the quantity of gas obtained from the same

quality of coal. A short time ago this question exercised the minds of the committee of an important municipal gas undertaking. Not only did the reports from their several stations seriously conflict, but even the experimental trial of the same sample of coal, when made by several engineers, gave results which were entirely irreconcilable. A special sub-committee was, of course, appointed to inquire into the matter; but we very much doubt if their report cleared up the difficulty. Now, if the conditions in this case had been alike, the results would have agreed, and a proper statement of the exact circumstances under which the experiments were made, showing in what, and to how great an extent they differed, would have enabled competent men to make fair deductions from them. One man has a rooted antipathy to high heats, while another counts them as the very corner-stone of success. One holds it to be economical to make up the required illuminating power of his gas by the use of cannel, while the other would reduce his make to save the use of cannel. Again, it is admitted that by several processes the yield of gas from coal may be largely increased above the average, and its illuminating power maintained by the absorption into it of certain volatile hydrocarbons at present sent away in the tar. At what cost is this result obtained? to what extent is the value of the tar reduced? and is it possible that the loss in this item balances the gain in gas? Questions of this sort could be satisfactorily determined if a number of men would conduct experiments, not by any means necessarily upon the same coal, but each keeping throughout to one sample, and working under different conditions of temperature in the retort and varying methods—within practical limits—of condensing and purification to be laid down by the Committee. Again, the questions that were incidentally raised as to the permanence of the full lighting power of gas which had been enriched by any means or by any material applied to it after the retort; and the depreciation of gas by being stored for a length of time, or by travelling long distances, seem to us to be very simple questions that might be definitely and conclusively set at rest once for all, and on which there is yet much conflict of opinion. At the same time there are others that we need not state, but which will occur to practical men, in which such combined, yet independent research would be of immense value.

The consideration of this question opens up a possibility which is to us most attractive, and to which we shall probably recur. If the Association takes in hand this work of drawing together the threads of many investigators labours, and is able, as it would be, to show clear advantage resulting, would it not establish a claim upon Companies and Corporations which they would readily recognize? We believe that on the recommendation of the Committee, backed by evidences of the kind of service proposed to be rendered, those bodies generally would be prepared to subscribe, and that liberally, to a fund having the object of extending the work. Thus the dream of a permanent home for the Association might be realized; and that home would be not simply a more or less ornamental building in which the general business might be transacted and meetings held, but a centre of the active life of gas science and industry in the country.

Another of those discussions, with which we are now so familiar, respecting the disposal of the surplus profits of gas undertakings belonging to Corporations, arose at the last meeting of the St. Helen's Town Council, when a very close division took place on the question whether a certain portion of the gas profits, left after various apportionments of the gross accumulated profits to capital account and reserve-fund, should be handed over to the borough-fund for the general benefit of the ratepayers, or be added to the reserve-fund recently established by the Committee. Strangely enough the vote was taken on an amendment which did not express the point upon which the discussion had really turned. The Gas Committee presented a report in which, after placing the round sum of £2000 to the credit of a reserve-fund, they proposed to hand over to the borough-fund £1126; when a rather vaguely-worded amendment to the effect that this sum should be applied to reduce the price of gas, was moved, and met with many supporters, including the Mayor, who, when the final vote was taken on a revised amendment devoting the amount in dispute to the reserve-fund, found himself in the position of having to give a casting vote, the numbers being equal, and he then distinguished himself by voting against the proposal which he had permitted to take the place of that to which he had previously given his adhesion. Certainly the two amendments were not identical; but the same principle—that the gas profits belonged to the gas consumers—was common to both, and it is therefore difficult to see the consistency of the Mayor's action. A Director of the defunct Gas Company was present, and made the statement that, under the circumstances, the Company would have reduced the price of gas, the position of affairs fully warranting a reduction of threepence per thousand feet. This course, however, was rejected, as above stated, the decision eventually arrived at causing some surprise in the Council—a feeling which is likely to be echoed outside.

Negotiations are to be entered into between the Corporation of Newcastle-under-Lyme and the Gas Company at present supplying the town, for the purchase by the Corporation of the undertaking of the Company. The question has been in abeyance for some time since it was first mooted, for various reasons, the chief apparently being that some of the more progressive members of the Corporation, at the time when the idea first took shape in a clause inserted in the Corporation Act of 1877, authorizing the purchase, have since failed to retain their seats in the Council, and the eclipse of these ardent spirits appears to have so far daunted the remainder of the members of the Corporation, that they have not moved in the matter with any great energy until the present time, when the imminent lapse of the period during which the Corporation will be allowed to make up their minds has induced them to bestir themselves. The whole question having been referred to the Lighting Committee, that body has reported favourably of the proposed purchase, and the Council unanimously resolved to take action in the matter, and we shall probably soon see whether the transfer is to be settled amicably or otherwise, as it seems to be inevitable.

The details of the gas accounts of the Rochdale Corporation, given in last week's issue, are commendably explicit. The item of most interest observable in the prefatory statement of the general results is the great success claimed for the St. John purifying apparatus and carburetter, which in six months winter working is credited with effecting a saving of £870, or an average yearly economy of about £1000. This is a surprising statement, and one which is scarcely intelligible on any theory of condensation generally accepted at present, by which gas may be enriched by its own accompanying liquid hydrocarbons. The production of gas was over 5 million cubic feet in excess of the corresponding period of the previous year, and the illuminating power was more than 18 candles—the usual standard for Rochdale gas—while the consumption of cannel was about 2400 tons less, the difference being made up with ordinary coal, the total weight of coal and cannel used being only about 40 tons more than in the period with which the comparison is made. The difference in the two results is certainly remarkable, and will doubtless attract attention from other quarters. It is difficult to believe that it is owing entirely to an apparatus of the kind mentioned; but no other explanation is offered, and we are bound to suppose that all other conditions have remained the same. Setting aside the increased rate of production, it is evident that a great impulse will be given to the solution of the question of the treatment of gas in contact with tar and hydrocarbons, by the publication of statements of this kind, of independent origin, and of accuracy guaranteed by the irrefutable logic of cash expended for work performed. Such are the facts as they are given to us, and we shall look with much interest for the production of any further evidence tending to confirm or refute the inference which in this instance has been drawn from them.

Chesterfield has the advantage of having its gas and water supplied by one and the same Company, which, in these days of trading Corporations, is an arrangement of increasing rarity. Still the Chesterfield Corporation can scarcely be called happy, and some of their grievances have found their way into the local newspapers. A complaint is made that although the price paid for the public lamps was raised in consequence of the high price of coal in 1875, the subsequent fall in the value of the latter commodity has not been followed by a reduction to the old prices of the era before the coal famine. The Directors of the Company state, however, that the price even now paid does not give them a profit, so that eventually we find that the existing terms were agreed to for another year. Respecting the selling price of the gas to private consumers, the wish was expressed by a deputation of the Council who recently waited on the Directors of the Company, that a reduction from the present charge of 4s. per thousand feet might soon be made; but as the Company barely pay an average dividend of six and a quarter per cent. on the whole of their stock, and the consumption of gas is not of an elastic nature at present, the Directors did not see their way to promise an early reduction. We may indulge the hope, however, that the consumers will be allowed to participate in

any improvement which the business of the Company may show.

The *Engineer*, in a recent issue, drew attention to the advantages of gas coke as fuel for steam boilers, in an article which is full of valuable information for those who are so wedded to the use of steam coal for this purpose, that they are apt to unduly depreciate the value of the cheaper article. To gas managers, who are accustomed to use coke for every kind of boiler, it may well seem late in the day for the advocacy of coke as fuel in this country, much as though it were a product of recent introduction. Roundly stated, gas coke suffers in the estimation of engineers—who want a fuel to stand a very strong draught—on the ground of its lightness; while with a bad draught it cannot properly be consumed, and its bulk (as compared with coal) necessitates a correspondingly large furnace. But apart from the instances of furnaces which are too small, or have insufficient draught, or of a blast strong enough to blow it away, there is undoubtedly a large number of users of coal who might as well or better employ coke, while it would in most cases be much to their pecuniary advantage to do so. Wherever a great amount of radiant heat is required there can be nothing to equal coke; hence, for short or vertical boilers, it is unapproached in duty by any kind of coal. In one of the instances quoted by our contemporary as of recent date, the evaporative power of gas coke of ordinary quality was nearly 9 lbs. of water per pound of coke, while in the same boiler coal only evaporated 5 lbs. of water per pound. Another case carefully investigated gave 8·1 lbs. of water vapourized per pound of coke, both of which results, we need scarcely say, being remarkably high. These facts cannot be too widely known, as they go to show that, weight for weight, and totally irrespective of price, coke is in some cases, and perhaps more frequently than is popularly supposed, of double the value of steam coal for heating boilers. This being the case, it would be well worth while in many instances to persevere in its use, even to the extent of making suitable arrangements for consuming it to advantage, if such did not previously exist, especially bearing in mind its valuable property of burning without smoke. Of course, much of this recommendation will also apply to furnace coke; but gas coke has the advantages of more general distribution and lower price than the specially-made article, while in some respects it is better suited for general use.

Water and Sanitary Notes.

Once again it happened last week that a discussion on the question of the Metropolitan Water Supply took place at an hour so far advanced towards sunrise that the morning papers could do little more than mention the fact that something was said, and a certain thing done. Such was the fate of the discussion which took place on Sir William Harcourt's motion with respect to the constitution of the Select Committee which is to investigate the Metropolitan Water Question. This is rather awkward for Sir Richard Cross, who reiterates certain explanatory statements which he evidently desires to make public, but which fail to appear in the daily papers. At the same time there is a certain amount of agreement or co-operation between the present Home Secretary and the late Home Secretary, the former consulting the latter, and apparently acting on his advice. But in the deliberations of the Committee we may expect there will be considerable diversity of opinion, especially if Sir William Harcourt should continue to hold some of the views he has expressed in Parliament. His post on the Committee is that of Chairman; and on Tuesday there was a little contention in the House as to the parties who should be permitted to appear by counsel before the Committee. The privilege was granted to the Corporation, the Metropolitan Board, and the Water Companies; but Sir Richard Cross desired some extension, so as to provide for a representation from the extra-metropolitan water area.

In the discussion as to the constitution of the Select Committee, Sir R. Cross argued that it was to the interest of the consumers as well as of the Companies that an agreement should be come to with the latter, if possible. "Wherever "you procure a supply from," said Sir Richard, "you must "bear in mind that London is interlaced with pipes in con- "nection with the present supply, and that this laying down "of pipes will be a very serious matter with regard to any "new supply." Perhaps, when the new Home Secretary gets a little more initiated into the practical bearings of the Water Question, he will feel in some degree the importance of carrying the Companies with him, if it be possible, instead of defying them and setting them at naught. The Select Committee begins its sittings to-day, and according to present arrangements will meet every Tuesday and Friday until the inquiry terminates. The associated Companies have retained as their counsel Sir Edmund Beckett, Q.C., together with Mr. Pope, Q.C., Mr. Venables, Q.C., Mr. John Clerk, Q.C., and Mr. G. P. Bidder, Q.C.

Last Saturday week, at the annual dinner given by the Chairman of the Metropolitan Board, Sir W. Harcourt referred to the introduction of a new water supply for the Metropolis as something to be accomplished by the Board "in conjunction with other great bodies, like the Corporation "of London," the mode adopted being that of an aqueduct equal in its magnitude to the Thames Embankment; and the Duke of Cambridge "hoped he might live long enough to see "this great work accomplished." Sir James M'Garel Hogg, on his part, warned the ratepayers that they must not expect a great scheme of that sort to be carried out without having to pay for it.

The idea of introducing a competing supply into London is one which appears very tempting to some people, and is now being dangled persistently before the public eye. But the suggestion is obviously intended more especially as a kind of threat towards the Water Companies. Many things have to be considered in reference to a competing supply, but there are two of a very ominous character which relate to the engineering part of the question. First, where is the water to come from? and, secondly, how is it to be distributed? If the water be brought from a distance, the cost will be great, and the inhabitants of remote watersheds will plead their rights in the matter. There is also a grave objection to any scheme which will make the water supply of three or four millions of people dependent on the soundness and safety of a single aqueduct. If, however, a supply is to be sought nearer home, it may be doubted whether the chalk strata can be relied upon for a permanent supply adequate to the needs of the whole Metropolis. Concerning cost, there is an obvious element of uncertainty as to the estimated outlay for so vast an undertaking. But, supposing the supply obtained from a distant point, or from one near at hand, it has to be conveyed to the dwellings of the consumers, and it is in the highest degree unlikely that the Metropolis will consent to the fearful annoyance consequent on the tearing up of every road and footway in London for the purpose of laying down another set of mains and carrying the supply into the houses. The existing distributory works of the Companies must needs be purchased, and, although the threat of competition may be supposed to have some weight with the Companies, the prospect of something like a small earthquake will certainly not be relished by the busy and very crowded population of London. The water supply of the Metropolis constitutes a vast and complicated system, demanding far more care and consideration than people commonly suppose. We also question whether a new supply at a cost of twenty millions would be so good a bargain for the public as that which is represented by the scheme of Sir Richard Cross. For the purpose of carrying out a competing scheme, a large sum of money would have to be raised, whereas the arrangement devised by the late Government was a mere transfer without the raising of any capital.

The quarrel with the scheme of Sir Richard Cross, and with the provisional agreements which survive the disappearance of the Bill, is based on the supposition that the terms of purchase are extravagant. But it is an understood fact that the Companies were willing to submit the case to arbitration. As matters now stand, it is to be regretted that the Companies did not maintain their ground, and signify that if their undertakings were to be purchased, arbitration was the only method to which they would consent. The terms asked are simply those which would give to the Shareholders the income they now enjoy, with the addition from time to time of that which would accrue to them if they were left undisturbed. If the compact offers them anything more than this, there is reason for dissatisfaction on the part of the purchaser; but at present we are not aware that the terms of purchase go any farther than to give the Shareholders an equivalent for their present and prospective advantages. The only argument that can be adduced to the contrary consists in the high quotations recently apparent on the Stock Exchange in respect to the Companies shares. But there are some cases in which the shares would undoubtedly have risen had there been no Purchase Bill in Parliament. Granting, however, that the prospect of the transfer has been the main cause of the rise—and of this there can be no doubt—this does not necessarily prove that the bargain is unjust. The popular cry at the present time is for terms of purchase

which shall leave the Shareholders in a worse position than heretofore. It virtually amounts to a demand that the private incomes of a large number of families shall be arbitrarily reduced, in order that the command of the Metropolitan Water Supply shall be given to a public authority. So far there is, as we have before intimated, a kind of sentiment entertained which approximates more closely than is agreeable to the revolutionary maxim that private property is public robbery.

The half-yearly meeting of the Southwark and Vauxhall Water Company was held last Thursday. In their report the Directors stated that 1308 new houses had been brought into charge during the past six months, and 7616 yards of new mains had been laid in the Company's district. The dividend declared on the ordinary stock was at the rate of 7½ per cent. per annum. It appeared from the statement of the Chairman, Alderman H. E. Knight, that the expense incurred by the London Water Companies in opposing the Water Bills of the Metropolitan Board in 1878 was "something like £15,000." At this rate, the total expenditure connected with those Bills, including both sides, must have been £30,000—an utterly useless outlay. The Directors of the Southwark and Vauxhall Company, considering the very small dividend they had been paying, had not felt justified in discharging their share of the outlay until quite recently. In discussing the late proceedings in Parliament, with reference to the London Water Supply, the Chairman said the Companies were prepared to stand by the agreements which they had entered into with the Government, but "they did not care one iota whether the "agreements were to be carried out or not." Concerning the rating powers possessed by the Companies, these had been granted by Parliament, and in reliance thereon the public had subscribed £10,000,000. As to a new supply to supersede the present, he did not believe such a thing to be practicable. With regard to the Company's own Bill, providing for the extension of their works, it was thought desirable to await the result of the inquiry which was just about to begin. They had, therefore, decided to withdraw it, although altogether about £2000 had so far been expended on its promotion. The expenditure of the Companies in respect to the long negotiations initiated by Sir Richard Cross will also have to be met, if the scheme comes to nothing. It will thus be seen that the water agitation is not without cost, the burden of which must really fall on the public as ratepayers and water consumers.

We regret that our esteemed contemporary, the *Standard*, should so far depart from its usually polished style as to adopt the phrase "Water Cheating" for the title of a letter in which the writer complains that the London Water Companies raise their charges in proportion to the annual value of house property. The fact that an occupier is charged more now than formerly may be due to the circumstance that he was charged below the scale in previous years. But, in any case, the letter signed "Sigma," to which this offensive heading is given, is founded on an entire misconception of the principles which must necessarily govern the water supply of any town. When we read such intemperate effusions as the one now mentioned, we feel rather amused in the prospect of that rude awakening which will befall certain parties when the charge is levied by a "public authority."

The annual report of Colonel Bolton, the Water Examiner appointed under the Metropolis Water Act of 1871, has just been published as a parliamentary return. It shows that the total certified expenditure of the eight Metropolitan Water Companies to December 31, 1879, was £12,242,019, being an advance of £274,696 during the year. The estimated population, which in December, 1878, was 3,938,166, was 4,289,544 in December, 1879, and the number of houses had risen from 552,072 to 573,792. The average daily supply of water per head of the population last year was 32·56 gallons, and per house 238·52. In 1878 the quantities were 33·11 and 237·40. Thus the supply per head has diminished, while the supply per house shows an increase. This would imply a somewhat closer packing of the population.

A very useful treatise on "Water Supply" has just appeared from the pen of Mr. J. H. Balfour Browne. It gives in a succinct and lucid manner a mass of information on the water question, and is written down to a very recent date; but has the singular defect of possessing neither table of contents nor index. Mr. Browne, in the views which he advocates, or to which he inclines, is far more in agreement with Dr. Frankland than with Dr. Tidy. But, apart from the author's views, the book is of value as a repertory of facts and arguments bearing on the Water Question as it affects the country at large. The subject is treated from a sanitary standpoint, and does not enter into financial considerations, unless we except a few remarks towards the close, as to the way in which Water Companies raise their capital.

According to an answer recently given in the House of Commons by the President of the Local Government Board, it appears that the Government consider it impossible during the present session to obtain the passing of a Bill to regulate the Conservancy of Rivers. Undoubtedly the question is both large and complicated, and we fear it is one that will stand over for some time.

The Local Government Board having refused to sanction the scheme propounded by the Lower Thames Valley Main Sewerage Board for the disposal of the sewage of that district by a system of irrigation at Molesey, this troublesome question still awaits solution. The late inquiry, extending over seven weeks, is said to have cost £30,000. A Provisional Order has been issued, extending for three years the time allowed to the Board for the diversion of the sewage from the Thames —a very encouraging state of things for the ratepayers.

The Metropolitan Board have resolved not to take any steps towards throwing open the gardens of Lincoln's Inn Fields to the public. There are "difficulties" in the way, and an Act of Parliament will be wanted, besides which the Board do not seem to feel particularly concerned about the matter. But we apprehend something more will be heard about it.

RIVER WATER.

CONTINUING our notice of Dr. Meymott Tidy's recent lecture delivered before the Chemical Society, on the subject of "River Water," we arrive at that point where Dr. Tidy deals with the analyses whereby Dr. Frankland seeks to show that river water does not undergo appreciable oxidation in a run of a few miles. Dr. Tidy does not question Dr. Frankland's facts, but he disputes the conclusions. With much force and clearness, Dr. Tidy contends that the actual reduction of organic carbon and nitrogen between two spots in a river is a fact of much greater value than any analyses indicating the reverse, for the reason that Dr. Frankland cannot say that the organic matter found at spot B, where he collected his second sample, is the identical organic matter that was in the river at spot A, where he took his first sample. "Unless he can prove this "identity of the organic matter in the two samples," says Dr. Tidy, "I submit that experiments showing a similar quantity "of organic carbon at two spots as proof of non-oxidation, "cannot be compared, as a matter of evidence, with experi- "ments showing a reduction of organic carbon between two "spots as proof of oxidation." Dr. Frankland's experiments with polluted water shaken up in bottles, and exposed to light and air while thus confined, are shown to be altogether different from those conditions which occur in the case of running water in an open channel.

Dr. Tidy had an apparatus constructed consisting of twenty troughs, each ten feet long, each trough fixed so as to have a fall of one inch, and discharging into another placed under it at a few inches distant, inclined in the opposite direction. This arrangement existed throughout the series, so that a constant flow of water was thus obtained for a length of 200 feet, the supply being derived from a cistern at the top, which was replenished by the water being continually pumped up again from the bottom of the series. The troughs were lined with glass, cemented to the wood. The flow was at the rate of about one mile in an hour and a half. Six gallons of New River water mixed with from one to eight per cent. of filtered London sewage taken from the Abbey Mills pumping-station, after being run two or three times through this apparatus—sometimes only once—lost all its offensive smell. The change in this respect is said to have been "most remarkable." New River water, unmixed with sewage, showed in a mile run a decrease of organic carbon and nitrogen to the extent of 0·027 part per 100,000, the decline in the carbon being from 0·114 to 0·093, and in the nitrogen from 0·026 to 0·020. With 5·55 per cent. of sewage, the carbon was reduced in the mile run from 0·436 to 0·274, and the nitrogen from 0·156 to 0·100. With 8·33 per cent. of sewage the carbon fell from 0·673 to 0·286, and the nitrogen from 0·203 to 0·071. The last traces of the organic matter were the most difficult to oxidize. The first part rapidly disappeared, but as the organic matter in the water lessened, the rate of oxidation declined. But, as Dr. Tidy observes, the experiments were only comparable with the action of a river in the matter of run. The lining of the troughs was smooth, and the purifying agency of fish and plants was entirely absent.

We have only cited some of Dr. Tidy's experiments. The uniform results point to the same conclusions, and are diametrically opposed to the reasonings of the Rivers Pollution Commissioners. The latter state: "It will be safe to infer

"that there is no river in the United Kingdom long enough "to effect the destruction of sewage by oxidation." Dr. Tidy, on the contrary, is led to "the inevitable conclusion that the "oxidation of the organic matter in sewage, when mixed with "unpolluted water and allowed a certain flow, proceeds with "extreme rapidity, and that it is impossible to say how short "a distance such a mixture need flow under favourable con-"ditions before the sewage matter becomes thoroughly "oxidized." This much Dr. Tidy feels warranted in asserting, and its practical importance needs scarcely to be pointed out: "It is certain to my mind that there is no river in the "United Kingdom but what is many times longer than is "required to effect the destruction of sewage by oxidation."

From a discussion of the natural method of purifying running water, Dr. Tidy proceeds to consider what can be effected by artificial means. Here he lays down the principle that the powers of science and art must never be invoked (and he holds this emphatically in the matter of a drinking supply) to deal with a water which is primarily impure. "Given an impure source," he says, "there is no "help that I can see but the entire abandonment of the "source." "Art," he continues, "may be fairly asked to "improve a good water, but it is simple madness to ask her "to deal with a bad water." In urging the claims of rivers as one of the sources of water supply, Dr. Tidy explains himself to mean rivers free from sewage. This does not necessarily imply rivers that have never received a trace of sewage. In this sense it may be questioned whether there is any water in the world absolutely uncontaminated. But the demand is for rivers "the purity of which at the suggested intake can "be proved by chemical analysis, and the maintenance of "which purity law can demand." Where such a state of things exists, art can do much. The water must be efficiently engineered, including due provision for storeage, subsidence, and filtration. Concerning the rate of filtration, Dr. Tidy approves of two gallons per square foot of filtering surface per hour.

Finally, we come to a consideration of the extent to which statistics justify us in condemning or approving the supply of river water for drinking purposes. That disease may be caused by drinking impure water is a fact which Dr. Tidy considers proved beyond doubt. But in the case of river water the argument against its use is based, first, on the existence of germs; and, secondly, on the supposition that the oxidation process which might affect organic matter would probably leave organized bodies untouched. Without discussing the truth or untruth of the germ theory, the following question is raised:—Admitting that germs of disease pass with the sewage into a river, is there any evidence, chemical or otherwise, to indicate that these germs are not amenable to the same laws which govern organic matters generally? Admitting them to be organized cells, are they not so low in the scale of life that they may be fairly regarded as occupying a sort of borderland "between the organic and the completely "organized?" If the germs are not to be considered as mere organic matter, but as organized bodies (like fish, in fact), Dr. Tidy argues that they ought to increase and multiply, so that as we pass down a river, every town supplied from that source ought to exhibit a constantly increasing death-rate from the special disease. But statistics fail to show such results. It is also invariably found, as a question of time, that the progress of such a disease as cholera is not down a river, as the germ theory would indicate, but in the opposite direction.

Dr. Tidy has obtained the vital statistics, for ten years, of eighteen towns supplied by deep-well and spring water to compare with the same ten years statistics of eighteen towns supplied by river water. The total population in each case is about 900,000. The well water towns show an average death-rate of 22·72 per 1000, and the river towns a death-rate of 22·66, thus leaving a small balance in favour of rivers as a water supply in comparison with deep wells and springs. Wells have the advantage in deaths from fever, in the proportion of 8·488 per 1000 against 9·126. In cholera the proportion is still greater, being 0·710 against 1·147. On the other hand, river towns show to advantage in diphtheria, 1·457 deaths per 1000 being registered in river towns against 1·695 in well towns. The difference is most remarkable in the case of diarrhœa, the river towns having 8·644 such deaths as against 11·223 in the well towns. On the whole, the statistics fail to show that there is any manifest difference, in the matter of health, between the towns supplied from wells and those supplied from rivers. Other statistics, compiled by Mr. Baldwin Latham, have relation to London during the eleven years 1868-78. It is noticed as remarkable that in 1872, when Dr. Frankland reported the greatest amount of organic impurity in the river water supplied to London, the tables show the lowest death-rate, the zymotic death-rate being at the same time below the average. On the other hand, it is noticed as equally remarkable that in 1870, when the Thames and the Lea had the least amount of organic impurity, the death-rate and the deaths from fever and diarrhœa were above the average. A comparison of the death-rate in the river districts and well districts of London during the ten years 1868-77 shows that the mortality from enteric fever, scarlatina, diarrhœa, diphtheria, and dysentery is in each case slightly lower in the districts supplied with river water than in the districts supplied with well water; while, so far as cholera is concerned, the returns in both are identical. It is curious that the general death-rate is lowest in those districts which receive a mixed supply, partly well and partly river water.

The facts seem to warrant the conclusion that be the *materies morbi* what it may, organized matter or chemical poison, "it is "subject to the same laws of destruction as the ordinary "organic matter in sewage." As a matter of sentiment, Dr. Tidy acknowledges that he should prefer water from springs and deep wells. But the facts which justify the use of rivers are not to be denied, and may often prove practically valuable. Two questions are asked—first, Has there ever been a well-authenticated case where river water, having received sewage, dilution being considerable and circumstances favourable for oxidation, has, after a flow of ten or twelve miles, been manifestly the cause of an outbreak of disease? Dr. Tidy knows of no such case. Secondly, Has there ever been a well-proved case of an outbreak of disease resulting from the use of drinking water, where the chemist would not unhesitatingly, on analysis, have condemned the water as an impure source? Again Dr. Tidy knows of no such instance. The argument is therefore sustained that water analysis is a test of the wholesomeness of water. Indeed, if water analysis has not this virtue, Dr. Tidy fails to understand the value of water analysis at all.

A remarkable and well-known passage in the Sixth Report of the Rivers Pollution Commissioners is quoted. Speaking of the deep-well water of the Kent Company, the Commissioners say: "The supply of such water to the Metro-"polis generally would be a priceless boon, and would at "once confer upon it absolute immunity from epidemics of "cholera." It is now asked, "Do facts warrant that bold "promise?" Speaking as a medical man, and citing the general experience of his brethren, Dr. Tidy observes: "We "may fairly stand surprised when those outside our profession, "who have never had the battles we have had to fight with "the disease, have committed to paper such a startling "promise as 'absolute immunity.'" Reviewing all the facts, Dr. Tidy states his conclusions. In substance these are—first, that when sewage has travelled a few miles along a river bearing a due proportion in volume to that of the sewage, the removal of the whole of the organic matter will be effected; and, secondly, that whatever may be the cause of certain disease—*i.e.*, whether germs or chemical poisons—the *materies morbi* which finds its way into the river at the sewage outfall is destroyed with the organic impurity after a certain flow.

In the discussion which followed the reading of Dr. Tidy's paper, Dr. Frankland pointed out that a highly ferruginous tributary of considerable volume entered the Wear between Bishop Auckland and Durham, and materially improved the character of the water. The statement of the Rivers Pollution Commissioners respecting the goodness of the river water at Durham, was only that the water was good "considering "its source." With regard to the disappearance of sewage from the Thames between Lechlade and Hampton, Dr. Frankland stated that for several miles above Hampton the Thames runs through an immense deposit of flint, gravel, and sand, which sops up its water like a sponge, and restores it again at a lower level. Thus vast volumes are "exhaustively filtered" through gravel and sand, and the organic matter is consequently oxidized by means of a porous medium. Dr. Frankland objected to the trough experiments of Dr. Tidy, that they failed to represent the condition of things existing in a river. After an extended criticism of Dr. Tidy's lecture, Dr. Frankland submitted that the question, Can running water be, at all times, safely used for dietetic purposes a few hours or days after it has been mixed with sewage? is to be answered in the negative. A written statement sent in by Dr. Mills coincided in many particulars with the remarks of Dr. Frankland. Professor Huxley, as we intimated last week, sustained the germ theory in its more alarming form. Dr. Mills, in a communication which he has since published, says, "The "weeds in a river's bed, into which sewage is poured, constitute "a natural sewage farm, capable of absorbing chlorides, phos-

"phates, and organic matter in the ordinary way." This authority adds, "A great deal of the purification of the "Thames must be owing to this cause, ordinarily never consi- "dered." And he says, "I should regard with grave appre- "hension any proposal to dredge the bed of the Thames above "London." It is satisfactory to find that at all events the Thames is purified in some way, and it would seem that other rivers have also something in their favour. Dr. Tidy's lecture is full of interest, and even those who are opposed to his views acknowledge that, in several respects, his researches are of great value.

Correspondence.

[*We do not hold ourselves responsible for the opinions expressed by Correspondents.*]

THE USE OF GASEOUS FUEL.

SIR,—I should, under any circumstances, have felt disposed to reply to Mr. Fletcher's letter contained in your last issue, but the position I lately took at the meeting of the British Association of Gas Managers leaves me no choice. At that meeting I spoke somewhat strongly in respect to the statement Mr. Fletcher had made at the Society of Arts, feeling that it was advisable that in our Association any public state- ment of importance which was, or appeared to be, fallacious should be challenged.

Mr. Fletcher is a gentleman who is entitled to respect on account of the work which he has done in the production of apparatus which develops a high calorific power from coal gas; but although I so respect him, and am ready to believe that the burners which he employed in his experiments are superior to any others of a similar kind, I am constrained still to doubt the correctness of the results obtained, the more especially as part of his conclusions are founded on the assumption that the calorific power of gas for the *boiling* of water is directly proportional to its power to raise water through a limited number of degrees and at low temperatures. An illustration to the contrary will be found in the report of my observations last week at the meeting I have referred to. Mr. Fletcher's last statements work out to 900 units per cubic foot of gas, instead of, as previously, 1013, according to my calculation. The latest result is startling enough; but while I am quite satisfied that the Warrington gas is good, I can scarcely believe it to be so good as Mr. Fletcher's statements indicate.

Accepting for the moment, however, Mr. Fletcher's 900 units for low temperature, and assuming 90 per cent. to be realizable for the *boiling* of water, the power per cubic foot of gas sinks to 810. The *true* method is to actually *evaporate* water from the boiling point, paying due attention to atmospheric conditions, although it is true that those who are experienced can very well arrive at correct conclusions by heating known weights of water through a few degrees only.

What value, however, can be attached to experiments made with "a jet which has been tested at 10-10ths?" What means did Mr. Fletcher take to ascertain and fix the pressure, granting that the burners might have been right as to rate, at 10-10ths? Did he use a common syphon pressure-gauge, or a sensitive King's gauge? I must conclude that it was one of the first-named kind; for an experimenter who is content with a mere "jet" instead of an accurate meter or gasholder is not, I think, likely to attach so much importance to pressure as is requisite. Possibly Mr. Fletcher has not reflected that under different atmospheric conditions the same jet will require different operating pressures in excess of that of the atmosphere to pass equal volumes of gas.

Mr. Fletcher admits that "there is something wrong somewhere," as the available duty, even with a very imperfect apparatus, is greater than that stated as the maximum theoretical duty possible. Where stated and by whom stated? Does Mr. Fletcher know the composition of the gas he has used? or does he speak generally of ordinary gas, say of 16 to 20 candle power? If one knew the composition, the theoretical duty could easily be calculated.

As Mr. Fletcher still claims to have obtained a higher thermal effect than theory indicates, and as, moreover, he says, "I have been informed that the available duty, as obtained in the injector furnace, is also greater than the maximum theoretical duty of the fuel used, I cannot see the propriety of his expression, "that there is something wrong somewhere," unless by that expression he means to challenge the results obtained by philosophers of the highest repute. If he means this, then, after the statements he has made, he owes a duty to himself and to the world to pursue his investigation in the most refined and exact manner. He might thereby discover some unknown facts, which would, as I hope, tend to his own material prosperity and to the benefit of mankind.

In the meantime, I must continue to doubt the accuracy of results which are admitted to have been obtained in experiments somewhat crudely conducted.

F. W. HARTLEY.

55, *Millbank Street, London, June* 12, 1880.

[The remarks our correspondent refers to above, as having been made at the meeting of the British Association of Gas Managers last week, will be found reported on p. 950.—ED. J. G. L.]

IN addition to the awards already noticed, a special first prize at the Sydney Exhibition has been given to Messrs. Crossley Bros. for the "Otto Silent Gas-Engine."

IN reference to our remarks on "Gas Affairs at Bedford," in the "Circular to Gas Companies" of the 1st inst., we have since been informed that testing apparatus has been in operation, in accordance with the Company's Act of Parliament, since 1864, and "uniformly shows an illuminating power of not less than 16 candles." Also that, though the Company were satisfied that they had furnished yearly statements of their accounts, they (in order to satisfy the Corporation) sent duplicates for the past 14 years, considering that some of them might have been mislaid. It is, however, right to point out to the correspondent who calls our attention to the matter, that these circumstances do not materially alter the facts upon which our comments were based.

Parliamentary Intelligence.

HOUSE OF LORDS.

THURSDAY, JUNE 10.

The British Gaslight Company (Staffordshire Potteries) Bill and the Prescot Gas Bill were referred to a Select Committee, consisting of Lord Clinton (Chairman), Lord Foxford, Lord Leigh, Lord Greville, and Lord Hanmer; to meet on Monday, June 14.

HOUSE OF COMMONS.

MONDAY, JUNE 7.

Petitions against the Local Government Provisional Orders Bill (Stockton and Middlesbrough Water Order) were presented from (1) Timothy Hutchinson, (2) Corporation of Darlington.

Requisitions to withdraw petitions against the following Bills were presented:—Preston Improvement, from John Fletcher; Southwark and Vauxhall Water, from (1) Grand Junction Water-Works Company, (2) West Middlesex Water Company.

LONDON WATER SUPPLY.

Sir W. V. HARCOURT moved that the Select Committee on London Water Supply consist of 17 members. He said: I had agreed with the right honourable gentleman opposite (Sir R. A. Cross) as to the names of the gentlemen to form the Committee, but in consequence of Sir John Mowbray having stated that he is unable to serve, I am obliged to give notice to add another name—that of Mr. Hubbard, one of the members for the City of London—in place of that of Sir John Mowbray. As to this Committee, a desire has been expressed that power should be given to the parties to appear by counsel. To this I have no objection, and I have therefore given notice to move that the Corporation of London, the Metropolitan Board of Works, and the Water Companies shall have power to appear by counsel.

Sir E. COLEBROOKE: I had given notice of a similar motion with regard to the Water Companies. I know that one of the oldest and largest Companies desire to state their case in this way.

Sir H. JOHNSTONE: I do not wish to obstruct the business of the House, but I think it my duty to make an objection to the name of my honourable friend the member for Truro (Sir J. M. Hogg). I am sure that my honourable friend will act impartially, as he always does, but in his capacity of Chairman of the Metropolitan Board of Works he promoted a rival scheme two years ago, and I would ask, therefore, if it is in accordance with usage that he should sit on a Committee of this sort. I think it would be better that, instead of my honourable friend, a perfectly independent member, of impartial views, who has never expressed any opinion or acted against the Water Companies, should be on the Committee.

The SPEAKER: I must inform the honourable member that the question now is not whether one honourable member or another shall be on the Committee, but that the Committee shall consist of 17 members.

Sir R. A. CROSS: I am exceedingly glad, Sir, to hear what the right honourable gentleman says—that everybody concerned in this inquiry shall be allowed to secure proper counsel. I wish also to state, as I have said before, that the great object which the late Government had in view in proposing any course at all with regard to the Water Companies was that the Companies interested, with the representatives of the ratepayers and consumers, should be brought round a table. The great object of our Bill was, to get the Companies upon the floor of the House, so that we could talk the matter over, and hear what terms they proposed, and that afterwards we could submit those terms to the judgment of a Committee. It has been directly stated to the country that the late Government wished to force certain high prices on the consumers of London, but nothing was farther from our intentions. We intended nothing more than that the Water Companies should state the lowest terms they would accept, and that we should lay those terms before the water consumers, and submit them to a Committee. I think that was the first step to be taken in trying to obtain a proper water supply for London; for, wherever you procure a supply from, you must bear in mind that London is interlaced with pipes in connection with the present supply, and that this laying down of pipes will be a very serious matter with regard to any new supply. I think it will be to the interest not only of the Companies but of the consumers that you should get the companies along with you. That was our object, and whenever the consumers and the Water Companies meet together round a table, I have no doubt now, as I had no doubt before, that if matters are properly managed we shall come to terms which will be satisfactory on both sides. I have only risen to state what the object was which we had in view, because it has been so often misrepresented, as if we had been trying to force on the consumers of London prices which they were not willing to pay. I take the most straightforward course of contradicting that statement, and I say that all we did was to get the lowest terms at which the Water Companies were willing to sell, so as to submit those terms to the consumers and to a Select Committee, and see if they could be accepted.

The motion was agreed to.

The name of Sir William Harcourt was then put and agreed to. On the name of Sir James M'Garel Hogg being read,

Sir H. JOHNSTONE said: Sir, after the announcement of the Home Secretary, that the Water Companies will have power to appear by counsel, I think the allusion I made to my honourable friend the member for Truro comes with greater force than before, for it will now be in the power of the Metropolitan Board of Works to employ counsel if they think fit, and in the interest both of the public and of the Companies, I consider it far better that the tribunal should be constituted with the greatest regard to impartiality. I can scarcely think that my honourable friend is impartial on this matter, for, having come two years ago with a rival Bill to take away the rights of the Water Companies and obtain a fresh supply, he has appeared in Parliament as a direct opponent of the Water Companies. I would appeal to him himself whether on this subject he is a strictly impartial person. Only as lately as Saturday evening last, he announced himself as one who was ready to entertain any rival scheme to supply London with water. For these reasons I think that of all men in this House he is one who ought not to be put on a Committee of this character. We wish to have a full and impartial inquiry, and while I have no doubt that he is a man of a judicial mind, and will approach the question judicially, I do not, under the circumstances, see the necessity of putting him on the Committee, and I should be glad to see some other honourable member placed on the Committee in his stead. If justice is to be done in this matter, let it be done, but let it not be done with a gentleman on the Committee who has expressed a strong determination to take away the property of the Water Companies, and to supply London by means of a rival scheme. The honourable gentleman has appeared in the House, in connection with this subject, as a suppliant for an indemnity, and we had to grant him one for the expenses he had incurred in the matter of the Water Supply of the Metropolis, for a Bill had to be passed by the late Government to relieve the Metropolitan Board of charges which otherwise they would have been subject to for opposing the Water Companies on their own responsibility. After this, I

say it is against all precedent and constitutional usage for one who has deliberately formed views against the interests of the Water Companies to be on a Committee of this kind. Having expressed himself so strongly, and gone to enormous expense against those Companies, he is the last man who should be put on the Committee, and some person of equal impartiality, and less committed, should be placed there in his stead.

Sir W. V. Harcourt: I hope my honourable friend will not persist in his opposition. I think the canon he has laid down would make the appointment of any Committee extremely difficult. If you lay down a rule that no member shall be on a Committee who has ever expressed an opinion on the subject which is to come before that Committee, I think you will have very few Committees in this House. On the contrary, it is persons who have expressed strong opinions who constitute such Committees. What we have to do is to see that on the Committee one view does not predominate over another, and I think it will not be said that the honourable member for Truro will have a predominating voice on a Committee of 17. It is said that the honourable member has opposed the Water Companies; but he has not opposed them in his private, but in his public capacity. You might oppose the appointment of a private person, who might have a bill of sale on these things; but that is a different matter. The honourable member for Truro has acted entirely in a public capacity. If he were interested in Water Companies, there would be a parliamentary objection to his appointment on the Committee; but, as it is, the objection comes to nothing; and as the Corporation of London are represented by two of their distinguished members—or will be when the Committee is constituted—it appears to me that the Metropolitan Board of Works ought to be represented on the Committee by their Chairman.

Sir R. A. Cross: I entirely agree with what the right honourable gentleman has said, and I may say that the first name which suggested itself to me was that of the Chairman of the Metropolitan Board of Works. There is a distinct difference between private interest and public duty, and as the Chairman of the Metropolitan Board considers the matter, not from the point of view of private interest, but from that of public duty, I should be very sorry if he were not placed upon the Committee.

Colonel Makins: I think, Sir, it is to the interest of my honourable friend himself that he should not be nominated on this Committee. It was not calculated to strike the public with confidence in Parliamentary Committees when, acting with reference to a Gas Bill in exactly the same way in his official capacity, he left his chair and instructed his counsel on the other side of the table. It was remarked upon as calculated to shake the confidence of the public in Parliamentary Committees. There must be persons in the House capable of protecting the public rights almost as well as the honourable member for Truro.

Sir J. M. Hogg: Sir, as my honourable friend the member for Scarborough (Sir H. Johnstone) appeals to me, all I can say is that I shall leave my case entirely in the hands of the House and with the Home Secretary and the late Home Secretary. I should not have risen but for the observations of my honourable friend (Colonel Makins) below me, who ventures to tell me in this House that, as a member of a Committee, I acted in an improper way.

Colonel Makins: If I expressed anything of the kind, I unreservedly withdraw it. I merely said it gave the appearance to the public——

Sir J. M. Hogg: I accept my honourable friend's withdrawal of his remarks. I say that when I sat on a Committee I did my duty, as I ought to do; and if I am placed on this Committee—I do not ask it, but if the House places me on the Committee I shall do my duty there impartially, as the honourable member for Scarborough has said. As to my interest in gas or water companies, I have no private interest in them. I never had gas shares or water shares in my life. The interests of water companies are not the interests I seek, but the interests of the public. For ten years I have held the position I hold now, and as long as I have that position I shall endeavour to uphold the interests of the public, and not the interests of water companies or any other private bodies.

Sir E. Colebrooke: I think the honourable gentleman is not quite just to the honourable member for Scarborough. It is not merely a question as to the opinions he has expressed, but as to the manner in which he has committed himself to views which the Water Companies do not consider to bear justly on them. We have a right to ask, as my right honourable friend below me (Sir W. V. Harcourt) has said, that all persons meeting round a table to discuss a matter shall meet in a position of equality. Now the Metropolitan Board of Works are to be represented by their counsel and agents, and they are also to be represented by their Chairman. I do not think this is quite fair. A great desire has been expressed that the Water Companies should not be represented on this Committee, and a right honourable gentleman on the Treasury Bench went so far as to ask you, Sir, whether they ought not, by the rules of the House, to be excluded. But you might go farther, and say that the members for the Metropolis should be excluded. I think this would be a pity, and that it is desirable that they should be represented. Now that there are wild schemes afloat, and that there is talk of an aqueduct from the West of England, I think it is time for the ratepayers to look sharply into this matter. But I agree with my honourable friend the member for Scarborough that the Water Companies will be satisfied if they can speak for themselves in a fair way, and I think the Board of Works should be satisfied with the same concession. However, if the House is desirous that the Chairman of the Board of Works should be on the Committee, we must take it for what it is worth. I have no doubt the honourable gentleman will do his duty in the matter, but his vote will count as well as another's. I would ask my honourable friend the member for Scarborough not to press his objection.

Alderman Fowler: Taking it as a principle that all interests are to be represented on the Committee, I think the Committee would be incomplete without the presence of so distinguished a member, especially on the Metropolitan Water Question, as the Chairman of the Metropolitan Board of Works. I gave notice this evening to add the name of the honourable member for Lambeth (Alderman M'Arthur), who will be Lord Mayor; but the Government have met that by proposing to add the name of my right honourable friend the member for the City of London (Mr. Hubbard). I think the City of London, the Metropolitan Board of Works, and all other interests, should be thoroughly well represented on this Committee.

The name of Sir J. M. Hogg was then agreed to, as were the following:—Mr. Chamberlain, Sir Richard Cross, Alderman Lawrence, Mr. Brand, Mr. Pemberton, Mr. Caine, Baron Henry de Worms, Mr. Firth, Sir Gabriel Goldney, Lord George Hamilton, Mr. Thorold Rogers, Mr. Sclater-Booth, Mr. John Holms, and Mr. Parnell.

Tuesday, June 8.

Petitions against the Local Government Provisional Orders Bill (Stockton and Middlesbrough Water Order) were presented from (1) John Bowes, (2) Lewis Fry.

LONDON WATER SUPPLY.

Sir W. V. Harcourt: Sir, I beg leave to move the motion that stands in my name—"That Mr. Hubbard be added to the Select Committee on the London Water Supply."

The motion having been put and agreed to,

Sir W. V. Harcourt said: Sir, I now move—"That the Corporation of the City of London, the Metropolitan Board of Works, and the Metropolitan Water Companies be heard by themselves, their counsel and agents, before the Select Committee, if they think fit."

Sir H. D. Wolff: I rise to a point of order. The other day, when another Committee was appointed, we were told that the Committee would decide what parties should appear before them. I should like to know why another course has been taken on this occasion. It seems to me that there are other parties who should be heard by counsel, as, for instance, the Vestries. But the right honourable gentleman limits the appearing by counsel to certain parties whom he has selected. There must be a certain form of order in these matters. We were told the Committee would be authorized by the House to give permission to parties to appear, whereas the right honourable gentleman has on this occasion selected certain parties who, he thinks, should be represented by counsel. I should like to know why a different course has been adopted on this occasion from what was taken before.

Sir W. V. Harcourt: I may say that it was my desire to pursue the course the honourable gentleman has indicated, but my predecessor, the right honourable gentleman opposite (Sir R. A. Cross), impressed it on me that this particular course should be taken. I was very anxious that the question should be reserved till the Committee met; but the right honourable gentleman opposite felt so strongly that this was the proper course, that I thought I had no alternative but to accede to his wish.

Sir R. A. Cross: That is entirely correct. If the honourable gentleman the member for Portsmouth will refer to the report of the statement I made to the House, he will see that there was an understanding that all these parties should have a hearing. I pointed out the other day that there were other parties who would like to be heard, and I am sure the right honourable gentleman will grant them the same facilities as the Companies and the City of London. I quite agree with my honourable friend that other parties ought to be heard. I think the Vestries have a right to appear, and also a number of persons who are water consumers outside the area of the metropolitan district. I think everybody ought to be heard who wants to be heard, and who has a direct interest in the settlement of the question, as I understand the wish of the right honourable gentleman to be that, if possible, we should come to a settlement of this question by means of this Committee.

Mr. Otway: I do not know if I have apprehended the point of the honourable member for Portsmouth, but if I have it has not been answered by the right honourable gentleman opposite (Sir R. A. Cross). The question is not that these parties are not to be heard, but that they have not obtained their sanction from the Chairman of the Committee, but that it has been formally moved by the Secretary of State for the Home Department; whereas, in another case, the permission to appear was only to be obtained from the Chairman of the Committee. There is no doubt that there is a different procedure in this case from the other. In this respect the observations of the right honourable gentleman, the late Home Secretary, do not appear to me to answer the objection. Where great interests are at stake, clearly the parties who are so deeply interested should be heard by themselves or their agents. Here you have millions of property at stake, and if we are to believe all the articles published in the papers, that property is very much threatened by the possible proceedings of this Committee. It is an obvious necessity of fair play that the owners of this property should have an opportunity of stating their case. Therefore, although the procedure may be different, as my honourable friend states, from that of another Committee, it seems to me to be a just and proper one, that the owners of the property should be heard, and whether sanction is given by the motion of the right honourable gentleman, the Home Secretary, or by the Chairman of the Committee, does not much matter.

Sir W. V. Harcourt: I wish to have the matter understood. My own personal view was that I had no right, in moving for the Committee, to determine who were the parties to be heard; this, I thought, was for the Committee to determine when they met, and I always understood that all these parties would be heard. I found my right honourable friend opposite thought the other course was the best to take, and I assented to it.

The motion was then agreed to.

LIVERPOOL CORPORATION WATER BILL.

On the motion of Mr. Dodson, Sir Gabriel Goldney was discharged from further attendance on the Select Committee on the Liverpool Corporation Water Bill, and Mr. Ewart was added to the Committee.

Wednesday, June 9.

A petition in favour of the Ackworth, Featherstone, Purston, and Sharlston Gas Bill was presented from Featherstone Local Board.

The *locus standi* of the following petitioners against the Southwark and Vauxhall Water Bill was disallowed:—(1) Hampton Local Board, (2) Wandsworth and Putney Gas Company, (3) Inhabitants of Seething Wells, (4) Lea Conservancy Board, (5) Grand Junction Water-Works Company, (6) Lambeth Water-Works Company (except against certain clauses, and so much of the preamble as relates thereto), (7) Kent Water-Works Company (except against certain clauses, and so much of the preamble as relates thereto), (8) Chelsea Water-Works Company (except against certain clauses, and so much of the preamble as relates thereto, (9) Corporation of Kingston-upon-Thames (except against part of clause 5, and so much of the preamble as relates thereto).

Gas and Water Orders Confirmation Bill.—A petition (the petitioners not praying to be heard) against the Norwood (Middlesex) Water Order was presented from owners and occupiers of property in Cranford.

Liverpool Corporation Water Bill.—Requisitions to withdraw petitions against the Bill were presented from (1) Captain Devereux Herbert Mytton, (2) Wallace James Arthur France, (3) Shropshire Union Railway and Canal Company.

Thursday, June 10.

Liverpool Corporation Water Bill.—Requisitions to withdraw their petitions against this Bill were presented from (1) Earl of Haddington and others, (2) Lancashire and Yorkshire Railway Company.

Kibworth Gas Company.—The annual general meeting of this Company was held on the 7th inst.—Mr. W. Grant in the chair. The Secretary (Mr. J. Cayzar) read the report of the Directors, from which it appeared that the Company are progressing satisfactorily. A new chimney has been built at a cost of £50; but it will prove a great saving in coals. The gas registered by the meters was 2,409,900 feet, which was an increase of 185,100 feet on the previous year. The receipts had been, with last year's balance, £697 12s. 1d., and the outstanding accounts amounted to £164 6s. 2d.—making a total of £1198 4s. The expenses for the year had been £821 5s. 5½d., leaving a balance of £376 18s. 6½d. A dividend of 6 per cent. was recommended, which would take £240, leaving a balance of £136 18s. 6½d. The report was adopted, the retiring Directors (Mr. White and Mr. Horton) were re-elected, and a vote of thanks was passed to the Directors for their services during the past year.

Legal Intelligence.

CLERKENWELL COUNTY COURT.—Friday, June 11.

(*Before Mr. G.* Whitbread, *Judge.*)

THE GASLIGHT AND COKE COMPANY *v.* M'KINLAY.

This was a claim made by the plaintiff Company to recover from the defendant £2 9s. 9d. for gas supplied.

Mr. S. Moslin appeared for the Company, and Mr. Popham for the defendant.

The claim of the Company was originally for a larger amount, which had been reduced by a payment to the sum now claimed, the dispute being as to the charge of £2 10s. 6d. for 14,200 cubic feet of gas supplied. The officers of the Company proved, by the state of the meter, that the amount of gas named had been consumed. It appeared that from September to December, 1878, the value of the gas consumed was only 5s. 8d., and from December to March, 7s. 9d.; while for the quarter ending June it rose to £2 10s. 6d., the sum disputed.

Mr. Popham contended, on the part of the defendant, that if the quantity of gas consumed in the two heavy quarters of the year was as stated, it could not have risen to such a very large amount for the light quarter, the gas being used in the stable, where much less was required in summer.

Evidence was given by the persons in charge of the stables to the effect that certainly no more gas was consumed in the summer than in the winter.

His Honour said he was bound to take the evidence of the meter as to the quantity of gas which had passed through it. There was no remedy except to have the meter examined, which defendant might have done.

Judgment for plaintiffs for the amount claimed.

Miscellaneous News.

MONTE VIDEO GAS COMPANY, LIMITED.

The Eighth Ordinary General Meeting of this Company was held on Friday, the 28th ult., at the City Terminus Hotel, Cannon Street, E.C.—Mr. John Bramley-Moore in the chair.

The Secretary (Mr. John T. Denniston) having read the notice convening the meeting, and the minutes of the preceding meeting, the following report of the Directors was taken as read:—

The Directors submit to the Shareholders the annexed audited statement of accounts for the year ending Dec. 31, 1879.

The net revenue amounts to £47,774 12s., out of which provision has been made for bad debts and depreciation of works and plant, and £9000 has been transferred to contingency account, leaving a balance at the credit of profit and loss of £32,673 2s., which is sufficient to provide a dividend for the year at the rate of 6 per cent. Of this, 3 per cent., free of income-tax, has already been paid as an interim dividend to the end of June, 1879, and hopes are entertained that at no distant date the Board will be able to recommend the declaration of the balance.

The Shareholders were informed by circular on the 19th of March last that the Government of Monte Video and the Junta, or municipal body, had respectively entered into agreements with the Company by which payment for public lighting has been secured.

The agreement with the Junta guarantees, by the hypothecation of certain assessed taxes, the payment of current public lighting accounts, from Jan. 1, 1880. The agreement with the Government deals only with the amount of outstanding debt up to the end of 1879, the total of which the accounts show to be £64,172 12s. 2d. inclusive of the Government acceptances not yet matured. The amount in arrear is being paid off at the rate of about £1000 per month during 1880, and it is agreed that after this year the instalments are to increase annually until the whole sum is liquidated.

In view of the deferred collection of this Government debt the balance of profit of the year 1878 has been passed to a suspense account, where it will remain, as already explained to the Shareholders, until the receipts from the Government warrant its being further dealt with.

His Excellency Visconde de Mauá, having tendered his resignation, ceased to be a Director, and his colleagues avail themselves of this opportunity to record their high appreciation of the valuable assistance he has given them in their efforts to promote the welfare and success of the Company, and the Directors trust that before long His Excellency will resume his seat at the Board.

Mr. Bartlett James and Mr. J. L. C. De Salles, two of the Directors who retire by rotation, being eligible, offer themselves for re-election.

The Auditors, Messrs. Price, Waterhouse, and Co. and Mr. Edward Cheshire, retire, and offer themselves for re-election.

Balance-Sheet, Dec. 31, 1879.

Dr.				Cr.		
Capital authorized—				Cost of gas-works, mains, concession, plant, dock, and sundries, as per balance-sheet, Dec. 31, 1878	£542,800	15 3
30,000 shares of £20 each,	£600,000	0 0		Add expenditure during 1879	919	3 3
2,904 shares of £20 each, unissued	58,080	0 0		Total expenditure to date	£543,719	18 6
27,696 shares of £20 each, fully paid and issued to date	£541,920	0 0		Less for depreciation	4,080	14 8
Contingency account	31,000	0 0			£539,639	3 10
Added this year from profit and loss	9,000	0 0		Stock of cannel and coal	9,788	7 2
Sundry creditors, London	176	6 10		Do. gas-fittings	6,165	18 10
Do., Monte Video	2,098	1 2		Do. residual products	442	7 0
Bills payable	2,436	0 7		Do. materials for use	7,844	14 9
Dividends unclaimed	46	16 0		Do. do. sale	2,060	17 1
Interest in suspense, not received, Dec. 31, 1878	£3,355 13 8			Do. furniture, &c., in Monte Video	851	1 3
Less received from Government, 1879	762 11 4			Sundry debtors in Monte Video	10,718	1 6
	£2,593 2 4			Government accounts	38,662	7 6
Add, charged to Gov., 1879	2,683 19 11			Do. acceptances	25,510	4 8
		5,282 2 3		Sundry customers acceptances	1,480	9 5
Suspense account, for balance of profit, 1878		32,515 4 0		Furniture in London	£110 15 10	
Profit and loss, balance as per account below		32,673 2 0		Less for depreciation	10 15 10	
					100	0 0
				Bills receivable in hand and in transit	7,000	0 0
				Goods awaiting shipment and afloat	4,372	17 6
				Cash in Monte Video	1,536	7 6
				Do. London	974	14 10
		£657,147 12 10			£657,147	12 10

Revenue Account.

Cost of manufacture and expenses at Monte Video	£45,414	3 9	Sales of gas, residual products, rent of meters, sales of gas-fittings, &c. £92,366 8 3
Directors fees, salaries, and London expenses	2,878	12 1	Revenue from dock & workshops, &c. 4,793 8 8
Income-tax	1,005	8 4	Revenue from coal lighters 481 11 4
Exchange (balance)	155	1 7	Transfer fees 17 15 0
Interest (balance)	431	5 6	
	£49,884	11 3	
Balance to profit and loss account	47,774	12 0	
	£97,659	3 3	£97,659 3 3

Profit and Loss Account.

Dividend paid May 21, 1879 (final for 1877)	£16,257	12 0	Balance, Dec. 31, 1878	£48,772	16 0
Balance carried to profit in suspense, 1878	32,515	4 0			
	£48,772	16 0			
Bad and doubtful debts	£2,287	12 1	Revenue account for 1879	£47,774	12 0
Less received on old debt	277	12 7			
	£2,009	19 6			
Written off works and general capital accounts	4,080	14 8			
Depreciation of furniture	10	15 10			
Transfer to contingency account	9,000	0 0			
Balance	32,673	2 0			
	£47,774	12 0		£47,774	12 0

The Chairman said he had to propose—"That the report and accounts now read be received and adopted;" but before doing so would like to make a few remarks with reference to the great difficulties they had to contend with in the conduct of the Company. These difficulties had mainly arisen from political circumstances and the disturbed state of the country with which they had to deal, also the impecuniosity with which the Government of the country had to contend—all contributing indirectly to place the Company in difficulties. It had often brought the Directors into collision and conflict with the Government, but at the same time it was necessary to exercise much indulgence, because it was impossible for them to pay entirely when they had no means at their command. This would account for the considerable debt that the Government owed the Company; but the Board hoped and fancied they saw better times approaching when this debt would be paid. They had made arrangements with the Government and the Municipality that the arrears should be paid up, and that in future the collections for the gas should be handed over day by day to the Company. If these conditions, which had taken a long time to bring about, were faithfully carried into execution, and the Government had the good faith and ability to do it, he (the Chairman) had not the slightest doubt that in time the Shareholders would receive regular dividends. This, as the Shareholders were aware, depended upon circumstances and contingencies over which the Board had no control, but every influence that could be brought to bear by the Directors to accomplish this would be availed of. There was every disposition, despite all the changes of Government, that these conditions should be carried out; therefore they could only look forward with hope to the future. With regard to the prospects of the Company, he might mention that the concession, as was well known, would terminate in the ordinary course of things in a few years.

A Shareholder asked how many.

The Chairman said in seven years, but he was able to state that negotiations had been entered into to extend this time with the sanction of the Chamber of Deputies. As to the accounts, he would not inflict upon the meeting a series of figures which he knew the impossibility of their following; but would just state that in the year 1878 the consumption of gas was 96 million cubic feet, and in the year 1879 it was 101 millions. He mentioned this to show that prosperity was returning to the city, and that a great many of the inhabitants who had left it and gone away, from motives of economy, were returning. This accounted for the increased consumption of gas and receipts. By the accounts submitted it would be seen how good were the prospects of the Company, if the Government carried out their engagements of paying up as they were now doing. As to the contingency account, it stood at £31,000 in 1878, and £9000 had been added during the past year. The net revenue for the last twelve months was £47,744, and the amount written off for depreciation of plant was £4080. He expected, if the recent arrangements with the Municipality were carried out, the Board would be able to pay dividends in a short time, exclusive of the debt of the Government, which would come in afterwards to the good. In regard to the resignation of the Viscount de Mauá, he would like to state that the Board were of opinion that five Directors were quite sufficient to carry on the duties of the Company in London. The Directors were, every one of them, acquainted with the country, the language, and the customs of the people, and therefore he need hardly say one word in their praise more than this, that they ought to be very efficient Directors; and, speaking for his colleagues, he might say they certainly were. But it was desirable that there should be, if possible, at a future time, or as early as opportunity offered, some party connected with the Company of great influence abroad. For this reason they had suggested that when a vacancy should be open it would be desirable for the Viscount de Mauá to return to the Board. He possessed great influence and local knowledge—perhaps more than any other living man. He (the Chairman) thought he did not exaggerate at all when he said this, and therefore the desirability of keeping the vacancy for his return to the Board was obvious. When the Shareholders had considered this, he thought they would agree with the Board in the desirability of doing as they proposed. [The Chairman then proceeded to refer to certain statements made in a pamphlet which had been circulated among the Shareholders in anticipation of the meeting. Much of the subsequent discussion was in reference to these statements, and would not be intelligible unless Mr. Hodgson Jones's address to his "Brother Shareholders" were before our readers; and of this our space will not admit.]

Mr. Tatham disagreed with the remark of the Chairman that it was difficult to follow items of account when read out at public meetings. His experience had convinced him of this, that, although perhaps a large body of the Shareholders did not take the trouble to go into accounts, yet in the City of London there were numbers of people who did do so, and were quite as capable of understanding what was put before them as the gentlemen at the Board were. If the Shareholders would turn to the revenue account, they would find this item: "Cost of manufacture and expenses at Monte Video, £45,414 3s. 9d." This item was so unusual as to be unique in gas accounts. He was a shareholder in many gas companies, and he could look down and see whether, from year to year, this or that item had increased or diminished. They all knew that the question of coal was very important to a gas company, and he would like to know whether that had increased or diminished. He would like to know the proportion the public lighting bore to the private revenue. Anybody who knew anything about South American gas companies—and he was a director of one of them and a shareholder in others—would know that the whole sense of security and basis of prosperity of a South American gas company rested not so much upon the public lighting and the price paid as it did upon the broad basis of a popular and general consumption of gas. It was the basis of success not only of English gas companies, but every foreign gas company. A word as to the election of Baron de Mauá. No one who had been in the Plate, as he had, and had travelled about could fail to note the esteem in which that gentleman was generally held, and everybody acknowledged his general ability; but they must all be aware that there were

questions pending which made the Shareholders wish to know whether the Board, in dealing with this gentleman, were perfectly unfettered. If they felt that the Baron's experience was vitally important to them, acting with him as a colleague, one could hardly imagine them holding the scales with that evenness which would be demanded by the Shareholders on his (Mr. Tatham's) side of the table. Without attempting to cast any aspersion of any kind, he ventured to suggest, as the Viscount de Mauá had retired, whether it was worth while that he should be elected to a seat at the Board. His friends would have proposed him (Mr. Tatham) as a Director, but he had a letter from the Chairman to the effect that his brother Directors did not wish to elect another gentleman at present to a seat at the Board, and he at once retired, because he would be the last man in the world to attempt to sit on the other side of the table against the advice of those who sat there.

Mr. Micholls said the previous speaker had taken a great many words out of his mouth. The Shareholders had already heard that he had proposed himself as a Director, not for the sake of the remuneration, to which he was indifferent, but in the interests of the Company; in fact, he would serve them for nothing. The Directors were, he thought, too well paid. He then, at some length, expressed his high disapproval of the re-election of Viscount de Mauá as a Director. As to the dock, he said, from the first, he warned the Directors not to become dock proprietors, but to stick to their original trade. The Chairman, however, overruled him, and said that the dock would be a most valuable adjunct; but at a subsequent meeting he stated that it weighed heavily upon the Company. Again, he could not understand the amount of £9000 carried to the contingency account, and wished it explained. What really seemed to be wanted was an infusion of new blood into the directorate. It was all very well for the Chairman to tell them that all the Directors knew the language of the country; but they did not want any foreign language to tell them what was right and proper in the conduct of business affairs. In his opinion, if another Board were elected the shares would become more valuable. In conclusion, he begged the Board to adjourn the meeting, and constitute a Committee of Inquiry to whom all the correspondence, documents, and books should be open, and let the Committee report to a future meeting.

Mr. Urwick thought it was of no use going into the past. They had to do with the present, and if they all pulled together, and infused fresh blood into the Board, there was no reason why the Company should not succeed and become a thriving concern. He hoped the Baron de Mauá would not be reinstated as a Director. In the accounts the Directors used to give the Shareholders the number of private houses and public lamps supplied, and how the increase went on year by year; but now they had nothing to guide them, and nothing by which they could check the accounts. He was glad to see that the cost of producing the gas had decreased considerably. In the year 1874 the cost was £71,000, and the sale of gas £108,000; but then they used to receive a dividend of 8 per cent. In the next year the cost fell £10,000, and the receipts were £101,000, but they still had 8 per cent. Now they could congratulate themselves that the cost was £45,000, and the receipts £92,000, yet they only saw in this year's balance-sheet a prospect of 6 per cent. Then there was an increase in Directors fees this year of £415. What extra work had been done in the offices? He thought the report was very bare of information, and that the arrangements for the proposed extension of the concession should have been distinctly described. He complimented the Board on attempting to get an extension, for they had not yet had the chance of benefiting by it. The Board said that the Government were now paying day by day; but did the advices by the last mail inform them that such an arrangement would be adhered to? He thought that a dividend ought to be really in sight, if not in their pockets. It was very hard for them to have to wait so long, and especially for those who, like himself, had paid premiums for their shares, and saw them so much depreciated—a result largely due to a want of energy on the part of the Board. He had come to the meeting with the intention of moving that the report should simply be read and not adopted, but he left this to the Shareholders. He thought it was time they should express their opinion that they were satisfied with neither the Government out there, nor with the efforts made by those here who represented the Shareholders.

Mr. Lowe said that the way the accounts were presented rendered it almost impossible to follow with clearness what were the earnings and losses. He wished to ask the Accountants to draw up the accounts in a regular and systematic way, and not vary them as in past years. The Directors, he contended, should reduce their fees to £1000, as formerly. He looked upon the arrangement regarding the concession with a good deal of alarm, and, therefore, considered that the Directors were not to be congratulated on it in the least. He thought that under the present circumstances of the Company the Baron de Mauá's services had been improperly lauded by the Chairman, and he denied that the Baron possessed the immense local influence that had been alleged. He moved the adjournment of the meeting for a month.

Mr. Sinclair seconded the resolution.

The Chairman pointed out that there was a first-rate Committee sitting in Monte Video, and in them the Shareholders might have the fullest confidence. The necessities of the Company were well looked after by these gentlemen in every respect.

Mr. Bartlett James (a Director) said in regard to the increase of Directors fees, it arose in consequence of a sum paid to him for his expenses during his visit to the Company's property. The fall in revenue was explained by the fact that since 1874 Monte Video had not been quite the prosperous place it was before. The inhabitants had fallen in number from 150,000 to 100,000, and for the last three or four years there had been much distress in Monte Video and its vicinity. Therefore, looking at these circumstances, over which the Board could have had no possible control, he thought the revenue might be regarded as not unsatisfactory. He then entered into explanations upon other points regarding the management, and the pamphlet before referred to.

A Shareholder: When are the sums due to the Company by the Government likely to be paid?

Mr. Bartlett James said the Government had engaged to pay £12,000 in 1880, £17,000 in 1881, £22,000 in 1882, £13,000 in 1883; thus making up the total debt of £64,000.

Some of the Shareholders having expressed their satisfaction with the explanations of Mr. Bartlett James and the Chairman, the resolution for the adoption of the report was put, and carried with two dissentients.

The two retiring Directors, Mr. Bartlett James and Mr. J. L. C. De Salles, were then unanimously re-elected, as were also the Auditors, Messrs. Price, Waterhouse, and Co., and Mr. Edward Cheshire; and the meeting closed with a vote of thanks to the Chairman and Directors.

Beccles Gas Company.—The ordinary general meeting of this Company was held on the 7th inst., when a dividend of 8 per cent., free of income-tax, was declared. The recommendation of the Directors was also adopted to reduce the price of gas to 4s. 9d. per 1000 feet from the beginning of April last.

SOUTHWARK AND VAUXHALL WATER COMPANY.

The Half-Yearly Ordinary General Meeting of this Company was held at the Offices, Sumner Street, Southwark, on Thursday last—Alderman H. E. Knight in the chair.

The Secretary (Mr. Alfred Jelley) having read the advertisement convening the meeting, and the minutes of the last ordinary and late extraordinary meetings, which were confirmed, the following report and statement of accounts were taken as read:—

Your Directors have the pleasure to again refer to the continued prosperity of the Company and the improved efficiency and condition of the works and plant. 1308 new houses have been brought into charge during the half year ended the 31st of March last, and during the past half year 7616 yards of new mains have been laid within the Company's district.

The contract for the supply of coal to the Company's works having expired on the 1st of the present month, tenders for the future supply have been obtained by advertisement, and a satisfactory contract entered into for two years supply.

The Solicitors of the Company have been instructed to prepare a clause for insertion in the Metropolis Water-Works Purchase Bill, in order to carry out the resolution of the Shareholders as to the relative interest of the ordinary stock and class D shares.

Your Directors have not as yet considered it desirable to act upon the resolution of the Shareholders, passed on the 11th of December last, authorizing them to create and issue a further sum of £160,000 from time to time as they may think fit, either as ordinary shares or preference shares.

Your Directors have carefully considered the several Bills introduced into Parliament which would affect the interests of the Company. A lengthened inquiry has been held before the Inspector appointed by the Local Government Board in respect of the Lower Thames Valley Main Sewerage Bill, but the report has not yet been made.

Your Directors are at present unable to supply any further information respecting the Metropolis Water-Works Purchase Bill. The Company's Bill was reintroduced into the House of Commons on the 25th ult., and read a first and second time. Future action in respect of these measures will receive the most careful consideration of your Directors.

Enclosed herewith you will receive the half-yearly statement of accounts of the Company to March 31, 1880, which has been duly certified by the Public Auditor appointed by the Local Government Board, and by the Auditors of the Company. Referring to the statement of liabilities and assets, the sum of £21,658 8s. included in the £39,658 8s. has been deposited in the Court of Chancery, in pursuance of the Standing Orders of Parliament in connection with the Company's Bill. This sum has been invested in Consols, and interest thereon is accruing. The law and parliamentary charges in the half year have been increased by the discharge of exceptional liabilities, for which, together with other purposes, a balance had been carried forward.

Your Directors recommend that a half year's dividend at the rate of £7 10s. per cent per annum on the ordinary stock and class D shares of the Company, and £5 per cent. per annum on the preference stock of the Company, be declared, payable on and after the 15th day of July next.

Dr.—Revenue Account, for the Half Year ended March 31, 1880.

Maintenance.						
To Maintenance and repair of impounding and service reservoirs, filtering beds, works, and pipes, or for obtaining and storing of water, including the cost of materials and labour			£266	13	0	
Maintenance and repair of mains, pipes, fittings, meters, and works connected with the distribution of water, including the cost of materials, labour, and renewals	£8017	5 6				
Repairs of engines, &c., at the several works, included in Messrs. Harvey's accounts	4000	0 0				
			12,017	8	6	
Pumping and engine charges, including the cost of coals, wages, &c.			10,773	4	5	
Filtration, including cost of materials and labour			903	3	7	
Salaries of Engineer, Superintendent, and Clerks, and wages of Inspectors and Turncocks			3,308	1	7	
Rents			17	2	8	
Thames Conservancy			1,152	12	6	
Rates and taxes			3,991	2	3	
						£32,434 8 6
Management.						
Allowance to Directors			£1,020	16	8	
Allowance to Company's Auditors			21	8	9	
Salaries of Secretary, Accountant, and Office Clerks			1,382	12	1	
Superannuation			216	13	4	
Commission to Collectors			1,039	13	4	
Stationery, printing, and general establishment charges			632	11	10	
Law and parliamentary expenses			2,763	4	1	
Official Auditor and Water Examiner			91	18	8	
						8,068 18 9
Dividend and interest account for transfer of profits						45,165 11 6
Balance carried to next account, to provide for losses						4,000 0 0
						£89,668 18 9

Cr.—Revenue Account.

By Balance brought from last account	£4,000	0 0				
Surcharges on water-rental to Sept. 30, 1879	2,183	2 3				
			£6,183	2	3	
Less allowances for empty houses	£2,348	2 1				
Do. for overcharges	1,762	14 1				
Do. for bad debts	1,524	7 7				
			5,635	3	9	
						£547 18 6
Water-rents accrued to the date of this account						88,955 6 7
Rents received						63 16 2
Registration and transfer fees						101 17 6
						£89,668 18 9

The Chairman, in moving the adoption of the report, expressed his great pleasure at again meeting the Shareholders, and congratulated them not only at meeting them in a state of advancing prosperity, but also in being able to inform them that this prosperity had been attained concurrently with greater efficiency in supplying their district, both as to quantity and quality, and with greater economy in the water used. The Company were never doing their work so well, and were never so prosperous as now. He should follow his previous custom to go through the accounts, referring to those items which appeared to him to require explanation, to make the Shareholders as far as possible as well acquainted with the affairs of the Company as the Board were. There was nothing whatever in the share and loan capital account to call for any remark. As to the capital account for the half year ending the 31st of March, the Shareholders would find on the debtor side that the amount of expenditure under the second item was only £392, as against £1360 in the previous half year. This great decrease was owing to the fact that in the previous half year the Directors had an immense amount of work to do with their engines, and they had been spared this expenditure in the past half year. The item of main and service pipes connected with the distribution of water was £2196 this half year, as against £905 in the previous half year. This was an amount which always increased, and must increase, in connection with the extension of the Company's district. As was stated in the report, they had laid 7616 yards of new mains in the half year, and the increase in the item he had referred to was caused by the laying of new mains in their parliamentary district. The only

other item he need refer to in the capital account was the last—the excess of income received over payments, which was now reduced to £13,000 from £16,000 in the previous half year. Passing to the revenue account, he observed that there were many items which he would have to deal with rather fully and carefully, in order to explain to the Shareholders the reasons for the variations. If they looked at the column on the left-hand side, they would see an item of £12,017, which was the total under the head of maintenance, and it was made up of £4000 in the repairs of engines, &c., at the several works—included in Messrs. Harvey's account. It was the £4000 which they paid every half year off that account, and of which only two instalments now remained to be paid; and as to the balance of £8017, he must explain why it was so much increased, for it compared with £5200 last half year, and £5400 in the corresponding period of the previous year. The increase in the maintenance was caused by the determination of the Board to have their plant in a thoroughly efficient state. They had been fortunate enough to earn more money and increase their dividend, but they had not done this at the expense of the stability of their plant. This past half year it was reported by their Engineer that certain mains throughout the district required overhauling and relaying. Perhaps they had half a mile of 12-inch, and then a quarter of a mile of 6-inch main, and then another portion of 12-inch main. The 6-inch main being in the middle of the two portions of 12-inch main, obstructed the flow of water. Many of such cases had been remedied in the past half year, and the consequence was that the Company had been distributing water much more efficiently than before. In Rotherhithe the Deptford main had been replaced by a new main which had cost £1500. This main, however, was a very valuable addition to their plant, because, instead of having continuous complaints from that district, they were now supplying the residents in a thoroughly satisfactory manner. They had spent, as he had said, £1500 on this main, and had charged it to revenue, and this had to come out of the £2800, which they had spent in excess of last half year. They had also been called upon by the Board of Works to lower a main which had been previously laid across the Effra River—or Effra Sewer, as they called it now. When this main was laid, instead of taking it under the river it was carried straight across, and therefore the Board of Works, finding it was in the way, had called upon them to lower it. That cost the Company £700. There was also another main across the Effra River which they were required to lower, but this would not be such a costly work. They had also had to pay a contractor an accumulation of accounts, which, instead of being delivered every year, had been allowed to run on since 1874. It had all been paid off during the past half year. These facts would, he thought, show why the increase had been from £5000 to £8000. He was not surprised at the charges for maintenance gradually increasing, because it was their determination, whenever they found anything faulty in their works, to put it in order, even at the expense of charging the cost to revenue. That, he thought, would explain the reasons for the difference in the total of £12,000 this half year, as against £9000 last half year. In the filtration charges the item stood at £908 against £1322, so the Company had saved something—he supposed it was in the labour and other items. He could not tell exactly why it was, but he thought there was no doubt it arose from the extra supervision of the Engineer and his officers. The work had been more cheaply and efficiently done than before. The increase on the one hand and the decrease on the other brought out this result—that they had £32,400 this time against £30,500 last half year, an increase in round figures of £2000 under the head of maintenance. The next item was the management, and under this head the amount expended was £8068, against £4566 last half year, and £5640 in the corresponding half year of 1879. There was therefore an increase of £3500 in the item, as compared with last half year; but he was very pleased to be able to tell the Shareholders that he could give them an explanation of this which was thoroughly satisfactory to himself, and he believed would be to them also. The first item was that of stationery, printing, and general establishment charges, which was £632 this half year, against £388 last half. That included insurances which were always paid in the last half of the year. Then in the past half year the Company had had two or three special meetings, with all the expenses of stationery, &c. It was true that this was a small amount out of the £3500 for which he had to account. When they came to the item of law and parliamentary, he always thought the Shareholders might see if there had not been a leakage in that direction. This half year the item stood at £2703, against £51 in the previous year. This went a long way to account for the deficiency. They carried forward a larger balance of profit in the previous half year. The Directors had not chosen to divide all the money they had made, but had kept something in hand, knowing that there had been expenses incurred which they must pay. They, therefore, carried forward something like £18,000 last time—money which they had earned, and the Shareholders were really entitled to put into their pockets. The law expenses were first made up of an amount of £1100, which had been paid in settlement of an action incurred by the Company in a case against them. It was a trial which resulted in a verdict against the Company, as the Shareholders would remember, and rather than go further to law and uncontrolled expenses, the Directors decided to submit the case to arbitration. The case was arbitrated upon by gentlemen agreed to by both sides, and resulted in the Company paying £1100. The arrangement was thoroughly satisfactory to the Board, and he thought it would also be to the Shareholders. Then, in 1878, the Metropolitan Board of Works introduced a Bill into Parliament attacking all the Metropolitan Water Companies. They all opposed that Bill, to defend the interests of the proprietors; but in opposing it considerable expenditure was incurred—something like £15,000, he believed. At that time the Company were paying a very small dividend, and they did not feel justified in paying the £1200, which was their share, out of the small amount of their earnings, so they arranged with the other Companies that this was an item which might stand over till they could pay it. They felt that when they were paying 6 per cent. and carrying forward such a balance as the present one, the time had arrived when they ought to discharge this liability. They, therefore, paid their share of those expenses, which amounted to £1228. This would show the enormous expenses thrown upon the Water Companies in resisting the attack made upon them. That explanation would account for the whole of the item he was referring to; but he might tell the Shareholders that what might be called the legitimate legal expenditure incurred by the Company amounted to less than £200, and he thought this was very satisfactory, because it included Messrs. Bircham's charges for watching Bills in Parliament which might have affected their interests, and also all the items which occurred under legal expenses in defending their interests from petty summonses and petty attacks from various people throughout the district, as well as other liabilities. This pretty well disposed of the excess in the cost of management, with the exception of £500, which was accounted for by the extra allowances given to the Board. He hoped he had made all this clear, and that the Shareholders thoroughly understood how the item had increased. Going to the other side of the account, they would find under the head of allowances for empty houses, overcharges, and bad debts, that the item was £5635, against £4261 last half year and £5500 in the previous half. It was a large increase, and one which the Board did not like to see; but in this instance it had arisen from circumstances altogether beyond their control, because it was caused by a number of houses in one portion of their district having been pulled down for a public improvement. This caused the Company to lose the water-rates from those houses. There was also an exceptional number of new houses taken into charge; but they were not occupied for some time, and the Company were necessarily obliged to receive one or two months rates instead of six. That had operated very heavily in the past half year. The water-rents accrued to the date of the account amounted to £88,900, which might be called £89,000, compared with £87,000 last half year and £85,000 in the corresponding period of 1879. This showed a very satisfactory increase, and he was happy to say it was mainly due to an increase of new houses and new mains laid on throughout the district. To return to the other side of the accounts, the Shareholders would find that the item of dividend and interest account for transfer of profits was £45,165, against £50,597 last half year, and £49,000 in the previous half; and they might naturally say, "How is it you have only £45,000 to take to profits this half year, as against £50,000 last half, when you have earned more money this half year?" Well, the items he had mentioned explained the difference, and satisfactorily accounted for there being a less amount carried to profits, though more had been earned. He thought he had touched on all the items in the revenue account to which he desired to draw attention. In the next account there was the item of interest on temporary loans, which was £224 against £300 in the last half year, and £500 in the corresponding period of 1879. This was a satisfactory decrease, and it showed really that the Company had not been obliged to trespass so much on the kindness of their bankers as in previous half years. The balance brought from last account was £45,000, against £37,000 in the previous half year, and £28,000 in the corresponding half of 1879. From the £45,000 they had to deduct the £26,000 paid last half year for dividend, against £21,000 in the previous half year, and £17,000 in the corresponding period of last year. There was a balance, after deducting this £26,000, of £18,000, which would be added to the earnings of the half year under consideration, and out of which they would pay the dividends they now proposed. There was a balance applicable to dividend of £42,271, against £45,000 last half year, and £37,000 in the corresponding half of the previous year; so that, although there was less than last half year, the amount was £5000 in excess of that applicable at the corresponding period of last year, and the increase in the maintenance and the law bill accounted for the diminution in the amount as compared with last half year. Passing to the next account, he said the temporary loans stood at £39,658; and the Shareholders might say, "With this large amount, how do you make it accord with what you have told us under the item of interest on temporary loans?" It was explained in this way: In promoting their Bill in Parliament they had to deposit £21,000 under the Standing Orders. That £21,000 they borrowed from their bankers, and it was included in the £39,000. The £21,000 was invested in Consols, and the Company would receive dividends on it, which would leave them a profit on the interest they paid. This left really £16,000 of these loans, and since the accounts were printed this had nearly all been cleared off. There remained only £2000 or £3000 to pay. On the asset side of the account an item which he thought required explanation was that of "suspense." The parliamentary deposit stood, as he had said, at £21,000; then beneath that was expenditure on account of the Company's Bill in Parliament, £1333, and expenditure on works £2577. To the time the accounts were made up the expense of promoting their Bill amounted to what was shown. This included a great deal of surveyor's business and preliminary business in the preparation of the Bill. The item of £2577 was the expenditure incurred in making preparation to enable the Engineer and the Board to arrive at a sound judgment as to the works it was necessary to construct for the supply of their district. He hoped the items he had touched on were those which in the Shareholders opinion required to be dealt with, and he would be glad to give any further explanation that might be wished. Turning to the report, he observed that he had already referred to the fact that 7616 yards of new mains had been laid, and these had all been laid within the Company's parliamentary district. Those mains produced at the present time a certain amount of earnings, and as houses were built they would bring a constantly increasing revenue. The Company's contract for coal expired two or three weeks since, and the Directors thought it a favourable opportunity to issue advertisements for tenders. This was done, and tenders were received from eight or ten highly respectable firms.

A SHAREHOLDER: What is the price?

The CHAIRMAN said he could not give it for the moment.

The CHIEF ENGINEER (Mr. T. W. Rumble) said the price of the coal the Company most used was slightly lower than in the previous contract.

The SHAREHOLDER asked what the previous contract price was.

The CHAIRMAN said the information should be given when the figures were obtained. Continuing his remarks on the report, he said that the next paragraph referred to the Metropolis Water-Works Purchase Bill, which Sir William Harcourt had said was dead and gone. An inquiry was about to be made, and whether the Bill was dead and gone or not, the Directors were anxious to carry out the Shareholders decision respecting the division of the amount to be received under its provisions, and they had ordered this decision to be carried out, and instructed their Solicitor to prepare, for insertion in the Company's Bill, clauses which it was absolutely necessary should form part of it. Sir Francis Head moved an amendment in favour of the D Shareholders, and several of the Shareholders afterwards came and said they did not approve of it. The clauses were therefore necessary, and he told them that before the Committee of the House of Commons was the proper place for them to state their differences. The Shareholders would remember that they authorized the Board to issue £160,000 of unallotted capital at their last meeting. Up to the present time they had not found it necessary to issue any portion of it, and they were very anxious to keep good faith with Mr. E. J. Smith, the Valuator who acted on the part of the Government in the question of the Purchase Bill, although by issuing this stock they could have put a large profit in their pockets. £160,000 at 100 prem. meant £160,000 in their pockets, which they were perfectly entitled to, providing the capital was required for the purposes of their undertaking. The capital, however, in the opinion of the Board, was not required, and therefore they had not used the powers given to them for its issue; but should it become necessary, they would unhesitatingly issue it, and allot it proportionately among the Shareholders. Several Bills had been introduced into Parliament, but there were no particular Bills introduced last session which affected the Company very much. There were two or three which might have interfered with their mains had they been carried out; but everything was done that was necessary for protecting the Company's interests. They thought the Lower Thames Valley main drainage scheme such a barbarous measure that they could not pass it by without notice. They opposed it, and had notes taken of all the evidence, and he was happy to inform the Shareholders that the recommendations respecting the proposal would be of such a nature that some other means would have to be found for disposing of the sewage of the district. He next came to the Metropolis Water-Works Purchase Bill and the Company's own Bill, and the Shareholders

would naturally expect him to say a few words on the present position of the agreements between the Government and themselves. They had seen from the public press what had been done in the House of Commons, and they knew that a Select Committee had been appointed, to whom it had been referred to consider the value of those agreements. On this question they, and he believed the other Companies, were in accord; they did not feel it was necessary for them to take any action whatever. They had entered into these agreements, and, as honourable men, they said that if they were carried out they were prepared to perform their part. On the other hand, if it should be decided that the agreements were not to be carried out, then they would be rather pleased, because they felt satisfied, so far as they were concerned, that the amount they had agreed to take was not the full value of the concern they had to sell. Therefore they did not care one iota whether the agreements were to be carried out or not. He believed that the instruction given to counsel before the Committee would be to say that the Water Companies did not desire to offer any remark on the matter one way or the other. They would let the agreements stand for what they were, and leave it to the sound judgment of the men who would have the matter before them to form a proper opinion. As to the other matters before the Committee, one was to obtain a new supply, and the other was to alter the rating powers of the Companies. Both points were vital ones. As regarded the rating powers, it was to be remembered that the public had subscribed £10,000,000 on the faith of Acts of Parliament. The Act of Parliament had specified the manner and form in which the rates were to be levied. The public who subscribed this money were contented to receive no dividend for many years, and for many years more to receive a dividend far less than they ought to have had; and it was only now, when they were beginning to have a fair return, that agitators raised this question, and strove to take from them what had been honestly and legitimately earned. He would not say for a moment that the water-rates were levied in the wisest, fairest, and best manner possible; but he did say that they were levied in the manner in which Parliament said they should be levied. He felt that it was to the interest of the Water Companies to be represented by counsel before the Committee. They would not be there to obstruct in any way, but rather to assist in the solution of this great question. As regarded a new supply for the Metropolis, that was a question on which the Companies also felt that they must be represented by counsel before the Committee, to see that their interests were not interfered with in any way. With regard to the possibility or probability of a new supply, this was a question he did not choose to go into. He had not the slightest doubt that engineers would crop up like mushrooms, and would be ready to supply London with the most beautiful water one could imagine, and bring it from any conceivable distance for an incomprehensibly small sum. All such schemes, however, would have to be sifted before an intelligent Committee, and under the examination of counsel representing the Water Companies, and he did not hesitate for a moment to say they would find it neither possible nor practicable to indicate a source or introduce a service to the Metropolis in a manner that would supersede that of the present Water Companies. All this might have to be inquired into, and the Shareholders must always bear in mind that although the Companies might not now have, and never had a monopoly of the supply of water to their districts, yet Parliament had apportioned districts to the various Water Companies, and it was in consequence of their Acts of Parliament that the Companies had taken their districts, and that the money for the construction of various works had been subscribed. In former times the public generally were glad to have their service from the Water Companies. He felt satisfied that this subject would be fairly considered before the Committee of the House of Commons, and he hoped and believed that a proper decision would be arrived at. With regard to the Company's own Bill, he had told the Shareholders before that this was a matter of very great anxiety to the Board, and it would be remembered that when they set the Bill going nothing certain existed or could be ascertained as to what would be the course of events as to the Water Companies. The Directors felt it was necessary to put themselves in a position which would enable them to construct extra works and obtain an extra supply of water, so that, as time rolled on, they might not find that they ought to supply a certain part of their district, and were without the means of doing so. They therefore felt it necessary to apply to Parliament for power to extend their works. Those works were not absolutely necessary for the moment, because they would take some years to construct; but the Directors instruction to their Engineer was to give them an idea of the works which would be required so as to make the Company safe for about ten years, and so that they might be thoroughly efficient in all their departments, and not have to go to Parliament for some time. This was the object they had in promoting their Bill. They knew now the course events had taken, and it became a very serious question with the Board as to whether it was for their interest, and that of the water community generally, to proceed with their own Bill. That had been under their earnest consideration for the last few weeks, and they had really found the utmost difficulty in coming to a conclusion as to what was best to be done. They found themselves in this position, that the Home Secretary had said emphatically that he would deal with the question promptly, and that an important Committee had been appointed to examine the whole subject. It had appeared to them that possibly it would not be wise for the Company to proceed with their private Bill, but wait and see the outcome of the inquiry before the Select Committee. This involved a serious consideration, because their accounts showed that they had spent £1300; and he had no doubt that the subsequent expenditure had increased that amount to £2000, and this was a charge which must eventually be dealt with, and paid for out of revenue. It was not a heavy amount, but it was a matter that he ought to explain to the Shareholders, because it was an element in coming to a decision as to the course that should be taken respecting the Bill. The Directors felt that the whole of their energies would be required to protect the interests of the Shareholders and the Water Companies before the Select Committee, and they felt also that an opinion might be expressed that if all the Companies works were to be bought up, amalgamated, and taken in hand by some authority, the works the Company constructed might be considered unnecessary by the Committee of the House of Commons, or they might say they should be deferred. All these matters had been anxiously considered by the Board, and it was only just before they entered the meeting that they had been re-discussing them, and finally they had come to the determination that it would be to the interest of the Shareholders, and the water community generally, for them to wait and see the result of the inquiry. They had, therefore, decided not to proceed with their Bill this session. Referring next to the question of dividend, he observed that the Directors proposed a large increase. They had paid an increasing dividend every half year since they had conducted the Company's affairs. From the bad times, when they could not afford to pay their law bill, up to now, they had gradually increased their dividend from 2 to 3, 4, 5, and 6 per cent., and now they proposed 7½ per cent., and this was a dividend which they could fairly, rightly, and properly pay They had discharged extraordinary liabilities during the past half year, and after they had paid the proposed 7½ per cent. dividend they would still have left a balance of something like £10,000 to carry forward. This sum would be held to meet the extraordinary expenses they would have to pay, some of which would bear rather heavily on them. There was the £2000 expended on their Bill, the withdrawal of which was really not their fault. Then there were the long negotiations which were forced on them in bringing about an agreement for the sale of their undertaking. Those expenses must be considerable, and they must be borne by the Water Companies if the agreements were not adopted, so there were certain items of an extraordinary character which the Company must meet. Next half year the Directors would pay off another £4000, leaving only £4000 to clear off Messrs. Harvey's account. That £4000 represented an increased dividend of 1 per cent. for the half year, so he thought the Shareholders would quite agree with him that although there was a diminished amount of unappropriated profits carried forward—£10,000 as against £18,000—yet he had explained how £8000 had been expended in an extraordinary manner. Then they had also to put against the decrease the approaching cessation of the £4000 per half year to Messrs. Harvey, and the natural increase of their water-rents. It was, therefore, with the utmost confidence that he asked them to endorse the recommendation of the Board to pay a 7½ per cent. dividend. He hoped the statement he had made was satisfactory, and also that the Shareholders would feel that, in recommending the large increase of 1½ per cent. in the dividend, the Directors had not gone beyond what they were justified in doing, but that it was a dividend to which they were fairly entitled, and it was only paid after keeping the plant, machinery, and other matters in thoroughly efficient order. The Company had not increased their water-rates, as the public would make people believe, oppressively or unjustly. They had simply adjusted their water-rates, and those who had been paying infinitely less than they ought to have paid had been made to pay more. He was now in a position to answer the question as to the price they paid for their coal. The contract price for that which they consumed most of was 17s. 9d. per ton for large Welsh, delivered at Hampton, 16s. 6d. for Merthyr, and 11s. 6d. for small. The 17s. 9d. compared with 20s. 3d. in the previous contract; the other prices were about the same. Some of the other tenders were a good deal higher. He ought to have alluded to one other matter, and this was that during the half year the Directors had increased the remunerattion of the Secretary from £600 to £800 a year.

Mr. C. M. Vialls seconded the motion.

Mr. Van Tromp asked how it was proposed that the Company should be represented before the House of Commons Committee.

The Chairman said that the Chairmen of the Water Companies had a meeting on the question last week, and they passed a resolution that it was desirable that the Companies should act together in the matter, and it was also resolved that one set of counsel should represent them, each Company being also represented by its Solicitor, and that the Solicitors should act together. In reply to a Shareholder, he added that he wished the item of accrued rents was much larger. It was really the amount due up to last half year, which was now in course of collection, and out of which the Directors would pay the dividend proposed. The total amount was £88,900 for the half year. Every half year they put aside £4000 for bad debts.

The motion was then put, and carried unanimously.

The Chairman next moved the payment of the dividends recommended in the report.

Alderman Finnis seconded the motion, and it was also carried unanimously.

Mr. Van Tromp moved a vote of thanks to the Chairman and Directors, and warmly eulogized their services, and the Chairman for the lucid and perfectly impartial statement he had made.

Mr. Bradfield seconded the motion, and it was carried unanimously.

The Chairman expressed the acknowledgments of his colleagues and himself, and said he only hoped their efforts would be as successful in the future as they had been in the past. They knew that the prospects of the Company were exceedingly good, and, as he had said before, if they were let alone they would give the best water at the lowest price, and pay the largest dividend.

The proceedings then terminated.

PROPOSED PURCHASE OF THE NEWCASTLE-UNDER-LYME GAS-WORKS BY THE CORPORATION.

A Special Meeting of the Newcastle Town Council was held on the 3rd inst.—the Mayor (Mr. J. Gallimore) in the chair—to consider a minute of the Gas-Works Purchase Sub-Committee, to the effect that there should be reported to the Lighting Committee their opinion that it was desirable that the Town Council should exercise the powers possessed under the Newcastle-under-Lyme Gas Act, 1877, with reference to the purchase of the Newcastle Gaslight Company's undertaking. A meeting of the Sub-Committee was held on the 13th ult., and the resolution was submitted to a meeting of the Lighting Committee held on the 28th, at which it was decided to adopt the report of the Sub-Committee, and to recommend the Town Council to take the necessary steps to effect the purchase.

Mr. W. O. Briggs moved that the minute of the Lighting Committee recommending the purchase by the Corporation of the Newcastle-under-Lyme Gaslight Company's undertaking be confirmed. In doing so, he remarked that this was one of the most important matters which had ever come before the Town Council for consideration, and which the Corporation had engaged in. It would no doubt be within the recollection of the Council that under the Act obtained by the Corporation in 1877, powers were granted them to purchase the undertaking of the Newcastle Gaslight Company, and a time was specified during which notice of the intended purchase must be given to the Gas Company. This term would expire on the 1st day of August next. In November last the Town Council appointed a Sub-Committee to consider and inquire into the question of whether it was advisable for the Corporation to exercise these powers and purchase the gas-works. The Gas-Works Purchase Committee, having been duly constituted, proceeded to inquire from other Corporations and Local Authorities who had purchased gas-works the terms upon which such purchases had been made, and the results which had followed the transfers. In pursuance of the instructions given, a series of questions were submitted to the Corporations and Local Authorities thus applied to, and he thought he could not do better than avail himself of this opportunity of thanking the various Authorities for the great courtesy and readiness with which they had afforded full and complete information on the subject. The information thus supplied received the serious consideration of the Committee, and they were struck with the fact that the results all pointed in one direction—viz., that the purchase of gas-works had invariably issued in considerable advantages accruing to those Boards which had succeeded in negotiating the transfers. In every case there had been advantage in two respects—in the first place to the consumers, by reason of the tendency to a reduction in the price of gas when the works were under the management of the Local Authority; and in the next place to the ratepayers, by securing a balance of profit available for carrying out works of public improvement, thereby affording considerable relief to the rates. After considering the question very carefully,

the Committee could see no reason why the purchase of the gas-works in Newcastle should not prove as remunerative and advantageous—or at least secure to the borough some measure of the advantages which had been proved to result from the purchase of gas-works in other towns. Of course in Newcastle there were some points of difference which would follow upon different conditions as to the consumption of gas. For instance, so far as the statistics obtained by the Committee had shown, it would appear that the people of Newcastle were exceedingly economical in their consumption of gas; for while in Birmingham the consumption was 6000 feet of gas per head per annum, in Newcastle it was only 2500 feet per head. This might be an extreme comparison because of the large works in Birmingham, in which gas was extensively used for the purposes of manufacture; still there were other towns, of greater similarity to Newcastle, where the consumption of gas was much higher per head of the population than it was in this borough. The Committee, however, had based their calculations upon the present consumption of gas, which might be taken at a rough estimate as under 50 million cubic feet; and upon this calculation, and assuming that the charges upon capital account were not too great, they saw no reason why the gas-works might not, in the hands of the Corporation, prove remunerative, and of considerable advantage both to the consumers and the ratepayers. Of course it must be remembered that a good deal would hinge upon the price paid by the Corporation for the undertaking; but in the event of the Gas Company asking more than might be considered a fair and reasonable price, the Council ought not to hesitate to go to arbitration under the powers contained in the Act. At present the Gas Company declined to fix a price or state any figures until they had received official notice, under the corporate seal, of the intention of the Council to purchase the gas-works. The Committee had not, however, been working in the dark in this matter, but had obtained copies of certain statements which the law required the Gas Company to lodge at the office of the Clerk of the Peace for the county, and upon the figures contained in those statements the Committee had based their calculations as to what would be a reasonable price for the works. Assuming that the Council and the Gas Company could agree upon the price, the matter would be very simple indeed, and a transfer of the undertaking might be readily effected; but if they could not agree as to the terms, then the Council had power under the Act to submit the question of price to arbitration. The Committee had taken some pains to ascertain what were the principles upon which such arbitrations as these were conducted, and they found that the main evidence by which the arbitrator was guided in making his award was that given by professional experts as to the structural value of the works, plant, and mains. In fact, the whole works would be measured up by competent persons, and a valuation would be made. This seemed to be the fairest way of dealing with the case; but there was the element of expense surrounding a reference to arbitration, which the Corporation would no doubt, if possible, avoid. In fact, he thought it might be taken for granted that an appeal to arbitration would only be resorted to in case the Council considered the price demanded by the Company was an unreasonable one. The share capital of the Company, up to three years ago, stood at £20,000, with a mortgage loan of £5250. Since that time, however, the Company had issued new capital to the extent of £6000. This issue was made in December, 1877. The new capital now being called up was being used for the purpose of providing new mains, and the construction of a new gasholder and tank, so that the total capital, including the loan, now stood at £31,250; and the simple question which arose was—What shall the Corporation pay for the transfer of the undertaking? The usual mode of calculation had been reckoned at so many years purchase of the dividends, and from the returns the Committee had received, the prices appeared to have varied from 21 to 27 years purchase. But it would be delusive to suppose that the 21 years purchase would be the cheaper one, because it all depended upon whether the capital had been judiciously and economically expended, and this could best be tested by the cost per 1000 feet to pay the charges upon capital account. The cheapest works provided the largest quantity of gas at the least capital. This being the case, it became a question for the Council to consider whether the capital of the Newcastle Gas Company had been wisely and judiciously expended. Now the original Directors of the Company erected their first works at too great an elevation to supply the lower parts of the town with gas, and then the works had to be taken down and rebuilt where they stood at the present time. This being so, it was natural to conclude that unless the cost of the original works was written off the capital account, when the principle of valuation was applied the undertaking would prove to be overburdened with capital to that extent. It was a mistake, therefore, to suppose that the number of years purchase of the dividends was the best and only test to apply in order to arrive at the fair and reasonable price to be paid for the works. He trusted that the negotiations would be conducted in a conciliatory spirit, and without any acrimonious feeling. It was a business transaction requiring calculation, much careful thought, and full and fair consideration, and this he had no doubt it would receive. The Directors of the Gas Company were men of business; they were acting as trustees for their Shareholders, and would naturally try to obtain as good a price for their undertaking as possible. On the other hand, the Town Council were trustees for the ratepayers, and would see that too large a sum was not given for the gas-works; and in this respect they would be protected by the arbitration clause in the Act. He was of opinion that the lighting of the town ought to be in the hands of the Corporation, and he trusted that when the gas-works were transferred to the Town Council the undertaking would prove advantageous to the ratepayers and to the consumers.

Alderman BAYLEY, in seconding the motion, concurred generally in the remarks made by Mr. Briggs. He considered it was only right that the Corporation should have possession of the gas-works. He did not, he said, anticipate that any very large profits would be made out of the concern; but no matter how small the profits might be, he was of opinion that it would be to the advantage of the ratepayers and the consumers if the gas-works were in the hands of the Corporation. With regard to the delay which had taken place in the consideration of the gas-works purchase question, he thought the great cause of the delay was the excitement created some time ago by the electric light. It was thought that the electric light would supersede gas, and therefore the Council hesitated to enter into negotiations for the purchase of the gas-works; but this idea had now died away, and the only point on which the Council need have any anxiety was as to the attitude the Gas Company would assume in the matter. He saw no reason, however, to suppose that the Council and the Company would not be able to come to terms, and he really entertained a hope that the latter would accept a fair and reasonable price for their undertaking, without putting the town to the trouble and expense of referring the matter to arbitration.

Alderman LEECH congratulated the Council upon the satisfactory way in which they had discharged the duty of collecting information upon this important question. He quite agreed with Mr. Briggs that this was one of the most important matters the Council had been called upon to deal with, and that it required very careful consideration at their hands. The proposal of the Lighting Committee involved two questions—one of principle and one of evidence. In the first place they had to consider whether it was right that they, as a Corporation, should undertake the duty of lighting the town. To his mind it was as much the duty of a municipality to take charge of the lighting of its district as it was to look after the highways and sanitary condition of the district. Therefore on the question of principle he felt bound to support the recommendation of the Committee. Then came the question of whether it was expedient for the Town Council to undertake the lighting of the borough—whether it was desirable for the Council to expend a large sum of the ratepayers money in purchasing the undertaking of the Gas Company. Well, they were aware that at Stafford, Stoke, Burslem, Longton, and other places, the Corporations had purchased the gas-works, and it was a very singular thing that in every case where a municipality had purchased gas-works the undertaking had turned out very successful indeed. Besides paying the working expenses and the annual instalments for the repayment of capital borrowed, they had all been able to hand over a sum of money to the borough fund account. He saw nothing exceptional in the case of Newcastle which was at all likely to prevent the gas-works from being successfully carried on by the Corporation. As had been pointed out by Mr. Briggs, if the Town Council purchased the gas-works, they would probably be able to benefit the consumers by improving the quality and reducing the price of gas, and at the same time benefit the ratepayers generally by carrying forward to the borough fund a sum which would be used for the reduction of the rates. With regard to the electric light, he thought that gas had not yet had its day, and that the Council need be under no apprehension. From the evidence which had been collected with such care by the Sub-Committee, he was of opinion that the Council would do wisely to purchase the gas-works, and therefore he should support the motion.

Alderman MILLER advised the Council to be careful how they committed themselves to so important a measure as that proposed by the Lighting Committee. He was of opinion that the gas-works could be conducted much more economically as a private enterprise than they could be in the hands of the Corporation, and he also pointed out that as Newcastle was not a manufacturing town the Gas Company had to rely mainly upon private consumers. The matter was one which ought to be well considered before any particular line of action was decided upon.

Mr. BRIGGS remarked that the Gas Company were not allowed by law to pay a dividend of more than 10 per cent. He thought that gas-works conducted by a corporation might be more economically managed than if the works were conducted by a company who were not allowed to pay more than 10 per cent. With regard to Newcastle being a residential and not a manufacturing town, he thought this was something in their favour, as the undertaking would be less of a speculative one, and not so liable to be affected by depression of trade.

Alderman LEECH said he had just been informed that at a meeting of the Burslem Town Council the previous day the Gas-Works Committee placed £2000, out of their profits for the past year, at the disposal of the Council for the reduction of the rates.

The MAYOR said he was quite in favour of the proposal to purchase the gas-works. He did not quite agree with Alderman Bayley that the electric light had completely died away, because science was ever advancing, and the light might be so developed as to cause it to rise again. He was of opinion that for public places the electric light was really the light of the future. Still, notwithstanding this, he thought that the purchase of the gas-works by the Corporation would be a grand thing for the town.

The motion was carried unanimously.

Mr. BRIGGS said there was a second motion which followed as a corollary upon the first. He begged to move—"That in pursuance of the powers and provisions of the Newcastle-under-Lyme Corporation Act, 1877, this Council, by writing under their common seal, to be addressed and sent to the Secretary of the Newcastle-under-Lyme Gaslight Company, require the said Gaslight Company to sell their undertaking to the Corporation of this borough."

Alderman LEECH seconded the motion, and it was carried unanimously.

The proceedings then terminated.

METROPOLIS GAS SUPPLY.

METROPOLITAN BOARD OF WORKS.

At the Meeting of the Board on Friday last, the Parliamentary Committee submitted a report, which was adopted, in reference to the Bill being promoted in the present session of Parliament, by the Corporation of the City of London, to amend the law relative to the testing of the gas supplied by the Chartered, South Metropolitan, and Commercial Gas Companies, and to the forfeitures to which the Companies are subject. The Committee state that, on its being resolved by the Board not to proceed with the Bill, as was originally intended, in conjunction with the Corporation, a letter was written to the Board of Trade, suggesting that as the Corporation had given notice of a Bill, and as the defects which it was sought to remedy had been pointed out by the Metropolitan Gas Referees, the Board of Trade might probably wish to obtain the concurrence of the three Gas Companies concerned, to the necessary amendments of their Acts of Parliament, so that the law respecting the testing of the gas and the forfeitures to be incurred for defective gas might be uniform throughout their districts. The Board of Trade, upon receiving this request, entered into communication with the Corporation and the Companies. They also consulted the Referees as to the best method of remedying the defects complained of, and amended the Bill of the Corporation in various particulars. They had since taken the opinion of all the parties concerned upon the Bill as amended; and as it appeared to carry out the object which was desired by the Corporation and the Board, and was, in the main, in accordance with the views expressed by the Board, the Committee, acting on behalf of the Board, had, with the other parties, agreed to the amended Bill, which would probably now be passed as an unopposed Bill.

WEST OF SCOTLAND GAS MANAGERS ASSOCIATION.

(*Continued from p.* 881.)

Mr. W. BRODIE (Paisley) read the following paper on

GASHOLDER CONSTRUCTION.

The paper which I have the pleasure to read to you on gasholder construction is one of very great interest to every gas manager and to all those who have an interest in gas-works. No one will be disposed to dispute the fact that this is an age of progress, and that engineering has been kept in the front during its onward march. The ponderous land engines for our manufactures—the large, heavy locomotives for our railways—the magnificent steamboats with their powerful engines—give us overwhelming evidence of the advance that has been made; and when we compare the present size of gasholders with those that were made little more than half a century ago, we find the progress of this branch of engineering has at least kept pace with the others mentioned.

The first gasholders were made either square or rectangular in shape. There was a square one near Paisley about 20 years ago; and there are two rectangular ones working at present at Messrs. Henry Monteith and Co.'s extensive works at Blantyre. They are inside a house; and at many gas-works at present the houses that used to contain gasholders are

being used for storing coals, &c. Although houses are not now used in this country to protect holders from the weather, still they are used for this purpose in Canada, on account of the severe winters they have there.

About the year 1814 scientific men were of opinion that holders should not be made larger than to contain 6000 cubic feet; and, as an evidence of the great progress that has been made, there is one being constructed at present about 580 times that size. At first holders were made of heavy materials, and counterbalanced to reduce the pressure; but about 34 years ago they were made of No. 18 sheets, which size suited very well, and saved counterbalance weights. Governors not having then come into general use, the holders had to be made light to regulate the pressure in the street-mains; but seeing that governors have now come to be generally used, gasholders should not be made of less than No. 16 sheets, if under 40 feet; if 40 and up to 100 feet, less than 14; above 100 up to 160 feet, No. 12 should be used. The first and last courses of crown, and top and bottom courses of side sheets, should always be two numbers on the Birmingham gauge heavier than the rest of the sheets; and holders about 160 feet should have for these ¼-inch plate. As there is no considerable tensile strain on the crown sheets, it is a mistake to continue on large holders the thin sheets up to the crown plate. When you put a course of heavy plates next it you greatly increase the area where the light sheets commence, and consequently it will bear a much greater strain.

A very important thing is the rise of the crown, which should have neither too much nor too little rise. There was one near Glasgow lately which was a curiosity—it was about 30 feet in diameter, and had a rise of about 10 feet—the proper rise is 16 inches for the size. The person who made it was unaccustomed to the work. If made with too little rise, the water sometimes lodges; and I have seen holders that were very low at the crown plate, while the rest of the crown was up to the proper height. The water lay on the top of the crown plate and the first course of crown sheets. One is apt to think that the tension-rods are at fault in a case like this, but the joists are not properly cambered, as they have too much circle at the edge of the crown plate, and when bolted to the crown plate they carry it down in spite of the tension-rods. The best proportion for the rise of a crown is 17-32nds of an inch for every foot diameter of holder. I disapprove of the crown sheets being riveted to the purlins. There is always a slight hollow at the rivets, which keeps that part alternately wet and dry, and causes the plates to oxidize. Sheets for sides should be about 4 feet by 2 feet, and those on the crown about 5 feet long. Purlins should always be about 5 feet separate from each other, placed about 6 inches above the outside tail of each course of plates. The outer curb does for the outside course.

Holders up to 70 feet should have flat iron joists, and above that T-iron, to prevent them warping. There should always be one main joist at each column and one between, with minor joists between each of the main ones, these being about half the length of the main ones; and the purlins to which they are attached should be increased in size to carry them safely.

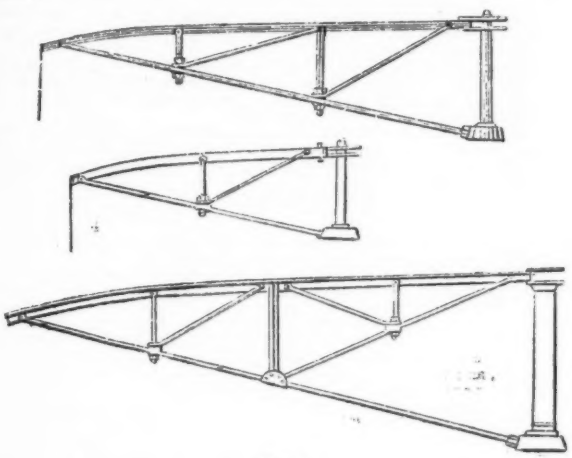


Fig. 1.

The detailed drawings, Fig. 1, give the members a better idea how different sizes should be trussed, than can be described in this paper. A 40-feet holder should have one T stiffening bar, with struts and rods at each column. One of 50 feet and upwards should have them both at the columns and at the centre between them. This is necessary because the sides of a holder are just like a piece of paper on edge, and will surely buckle if not supported; and it is just as important to have rest stones under every T-bar, because, if intermediate stones are wanting, the whole part from the centre of the crown to the outside between the columns will subside, T-bar and all, when the holder is resting. The rivets for 16, 14, and 12 sheets should be ½-inch diameter, placed 1-inch centres; and those for other parts—if 5-16th inch at 1⅛th inch, ⅜-inch at 1¼ inch, 7-16th inch at 1⅜ inch, and ½-inch at 1½-inch centres. Centre pillars should be at least three times the length of the rise of the crown, so that the tension-rods will be able easily to keep up the crown.

When telescopic holders were first made, the cup was formed of two angle-iron bars, a flat plate joining them; but Messrs. Piggott and Co., of Birmingham—first-class makers—make them of plate iron, the one plate forming both side plate and dip, and dispensing with angle or the channel iron. Channel iron is generally adopted in Scotland, and I believe makes, all things considered, the best job. If you will look at the detailed drawings, Fgs. 2, 3, 4, and 5, you will see the different modes. I think the flat channel bars are preferable to the others—not that the others will not do, but because the channel bars are very strong, and being flat they must cup evenly all round. The outer shell has sometimes channel and sometimes bulb T-iron guide-bars to keep the inner shell in proper position. Either way will do; but I prefer the T-bars, which press against the half-round cope on the cup of the upper lift. The inside lift may have a little play and still work well; but this will not be so if fitted with the channel bars and pulleys, unless great care is taken, as there is little room between the dip plate of the cup of the inner lift and the sides of the outer lift. The channel bars must be very shallow, and if the holder has any play the pulleys will come out of the channel, ride, and so prevent the holder from working satisfactorily. I have made them both ways, and got them to work well; but the one with pulleys and channel bars must be made to the exact size. A very important thing in making a telescopic holder is to have each lift at the top and bottom exactly to its circle. If the cups are

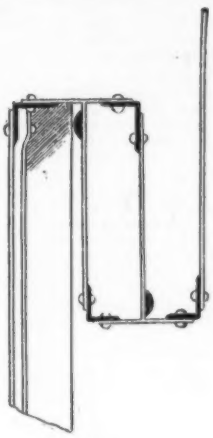


Fig. 2.

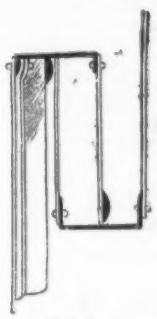


Fig. 3.

Fig. 4.

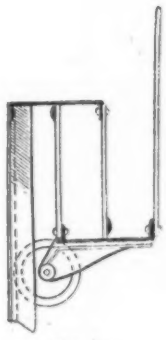


Fig. 5.

made a little oval, they will not work well, being so strong that very great friction will take place while cupping. All the rollers should be put on to keep them exactly round, and although the tank is made slightly oval, the brackets ought to be made to suit it. The water traps and pipes in a tank should be carefully put in and tested with water before the tank is filled.

In built tanks the stand-pipes outside the holder are sometimes recessed to the extent of their full diameter into the side wall of the tank. This is a very unsatisfactory way of constructing them, because you weaken the circle at the very place it should be strongest—namely, on the inside. Although the walls are strengthened on the outside at this part, still it is not equal to one having no recess at all. I know a case where one (near Glasgow) was built up half way when it collapsed at the recess, and had to be built again from the foundation. The better way is to take the pipe through at the bottom, and have the stand-pipes outside the wall;

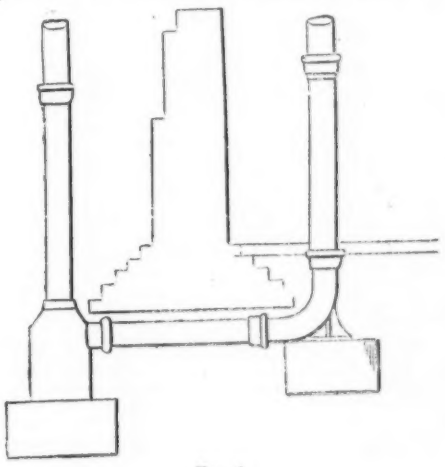


Fig. 6.

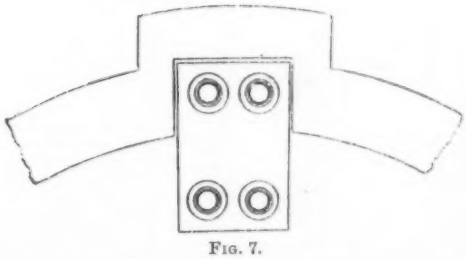


Fig. 7.

and if you look at the detailed drawings, Figs. 6 and 7, you will see clearly what is meant. Tanks for large gasholders should have at least 1 foot between the sides and the tank wall, and the smaller ones should have

either 9 in. or 6 in. between the sides and the wall. If the runs are sunk into the walls to their own depth, 6 in. will do; but if they project into the tank, then the tank must be 9 in. larger all round than the holders. Guide-pulleys less than 9 in. diameter do not suit well for the bottom pulleys; and if the tank is only 6 in. larger all round than the holder, you must either sink the runs or make the brackets to project into the inside of the holder. Before you can do so the sheet must be cut. This is troublesome and objectionable. In placing the runs in some tanks one very important thing has been lost sight of, and the result has been that some holders have come out of their position and broken the columns. It is quite common to have the runs in the tank forward and those on the columns back, thus breaking the continuous line of run that ought to exist from the top of the column to the bottom of the tank. If the runs are not in a line, stops should be put at the top of the tank runs to prevent the bottom pulleys from getting out of the runs. If the tank is completely full of water, and no stops, there is great risk of an accident through the pulleys getting out of their proper position. Where an accident occurred lately from that cause, the intermediate runs have been carried up about one foot higher than the cope of the tank, to prevent the same from happening again. By looking at the detailed drawings, Figs. 8, 9, 10, and 11, you will see the whole thing at a glance.

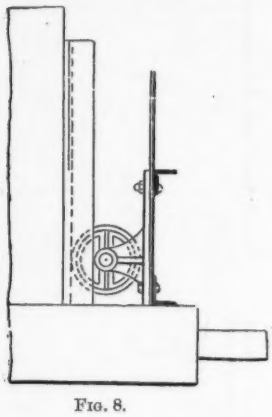


Fig. 8.

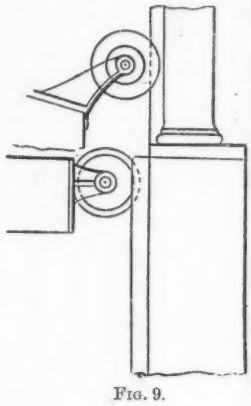


Fig. 9.

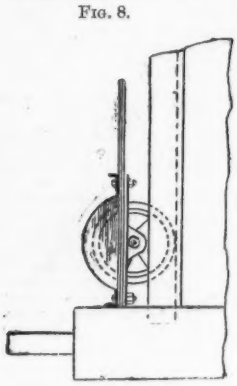


Fig 10.

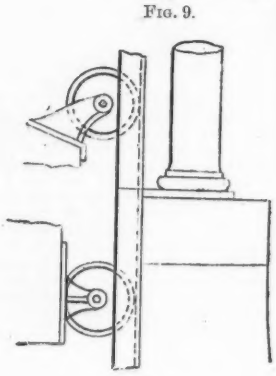


Fig. 11.

In no case should guide-rods with straps and bushes be used to guide holders, because they are very troublesome. Holders above 40 feet should have two bottom rings, with the joinings of the lower breaking band with the upper one; and where there is only one bottom ring, the clasps should be made long, with six rivets on each side of the joining.

It would be very difficult to give you a "constant" for the number of columns that ought to be in a holder of a given size. Holders 80 feet in diameter and upwards, if divided by 10, would give the number that would suit. Holders 60 feet in diameter should have 7 columns; 40 feet in diameter, 5; and 30 feet in diameter, 4. It is better always to have one more than one less than the number named. The soles of the columns are most important parts; and, while it is difficult to lay down exact data to go by in every case, an 18-inch diameter column will have a suitable sole if made double the diameter—say, 36 inches square. Smaller columns should be a little more, and larger ones a little less in the size of the square than twice their respective diameters. Girders are sometimes made, as you are all aware, of cast iron; but malleable iron is much preferred, and is safer than cast iron, which is so very treacherous, and so easily affected by differences of temperature. For small holders, a T-bar at the top and bottom, with flat diagonal straps and rosettes where they intersect each other, makes a first-class job. For large holders they are better with two angle-iron bars at the bottom, one on each side, and the same at the top, with straps and rosettes as described, or with neat cast-iron ornamental plates placed between the angles, as shown on the detailed drawing, fig. 12.

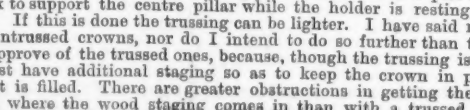


Fig. 12.

Holders are now fitted in some cases with two sets of girders—one at the middle, and the other at the top of the columns; and this certainly gives the framing a fine appearance, besides adding greatly to the strength. Holders of 100 feet in diameter and upwards should have a pier built in the tank to support the centre pillar while the holder is resting at the bottom. If this is done the trussing can be lighter. I have said nothing about untrussed crowns, nor do I intend to do so further than to state that I approve of the trussed ones, because, though the trussing is saved, you must have additional staging so as to keep the crown in position before it is filled. There are greater obstructions in getting the crown rivetted where the wood staging comes in than with a trussed crown, because the iron is less bulky than the wood.

In commenting on gasholders, many people have called them unsightly articles; but that only shows that they are bad judges. I have now been 34 years connected with their manufacture, and so far as I could see they are things of beauty, and are monuments of the skill and perseverance of gas engineers. Some persons are very anxious to dispense with them altogether, but I am afraid they will trouble them a long time yet. You may attempt to press the gas into smaller vessels, but extra pressure simply means stronger vessels, greater leakage, and the risk of a stoppage. Your old friend the holder is ever ready, and will never desert you. When the lightness of holders and their great size are taken into account, it is certainly a wonder that they are made so sweet to the eye. It is not like a ship or a boiler, the plates of which are heavy and rigid, and will stand as they are set; it is very different with working light iron, which is so liable to buckle. Five hundred mechanics may come to the workshop door seeking employment, and not one of them be competent to take the twist out of a sheet, or, in other words, to flatten it.

In regard to painting, all the malleable iron at least should receive one coat of good paint before leaving the contractors, and one during erection. The bottom course of sheets, the cups, and the sheets connected with them, should receive an extra coat.

In conclusion, I know that in reading this paper it contains little that is new to some of you, but there are others among you who know less, and if they derive any benefit I shall be very glad. In a paper of this sort it would be impossible to thoroughly exhaust the subject; but my object has been to draw your attention to the most important parts. Some people interested in gas-works know very little about gasholders. We were erecting one, and a director asked the manager when the bottom was going to be put into the holder. That manager has now gone to that "undiscovered country, from whose bourne no traveller returns;" and when I take a retrospective glance for 30 years or so, I feel sad in recalling to my mind so many of my dearest and kindest friends, gas managers, who have gone to their rest, and whose memories I shall ever revere.

Discussion.

The President: I am sure we have all listened with great pleasure to this paper. As I anticipated, it has been of a thoroughly practical description.

Mr. Leech: What is the difference between a low-crowned holder and a high-crowned one? The holder that Mr. Brodie speaks of gave complete satisfaction to the parties who bought it. Another holder was put up alongside it, which did not give the same satisfaction.

Mr. Stewart: We are all indebted to Mr. Brodie for his paper, as the gasholder is an important part of our apparatus, and requires to be carefully constructed. I understand that some of the large holders are now being built altogether of steel. In this way they will not weigh so heavy as iron holders. I propose a vote of thanks to Mr. Brodie.

Mr. Brodie: I have to thank you for the patient hearing you have given me, and Mr. Stewart for the compliment he has paid me. In reference to Mr. Leech's remark, I only mentioned the particular holder because it is different from those generally made. I have no doubt it was as good and as tight a working holder as could be had. A hat six feet high might fit a man of the ordinary size as well as one of six inches, but still it would not be nice to look at.

Mr. Stewart: But there is another point, and that is that a high-crowned holder would contain an amount of gas which could not be got for use, and its height would also catch the wind more than a low-crowned holder, and thus make it unsteady.

Mr. Robb: This paper is one of the most valuable contributions we have had for a long time. The facts that Mr. Brodie has given us will be exceedingly valuable to small managers who are obliged to do engineering work themselves.

There was no time to further discuss the paper.

THE LANCASHIRE COAL AND IRON TRADES.

(from our own correspondent.)

So far as all descriptions of round coal are concerned, trade in this district is in a very depressed condition. For both the better classes for house-fire purposes and the common sorts for steam and forge purposes there is less demand, and a considerable number of the pits are not running more than about three days a week. Although there has been no alteration on the list rates this month, prices are weak, with a downward tendency, and where sellers have to push for orders it is difficult to say what prices are being taken. For best house coal at the pit's mouth not more than about 7s. 6d. to 8s. per ton is being obtained as a rule; seconds average about 6s. to 6s. 6d.; and common round coals 4s. 9d. to 5s. 3d. per ton. In the gas coal trade extremely low prices are ruling, and I hear that the Manchester Corporation, who have now settled for a portion of their requirements, have secured contracts for delivery over five years, and at prices below those which they have previously been paying; screened gas coal being delivered at the works in Manchester at under 8s. per ton. I also hear that other contracts in this district have been concluded for long forward deliveries. These extended contracts are regarded with considerable surprise in the trade, as many of the principal Lancashire firms are declining to quote beyond next season's supplies. Cannel is generally steady in price, sellers not being willing, as a rule, to take anything under last year's rates. Engine classes of fuel meet with a fair demand, and are without material change so far as prices are concerned, the small production of slack enabling colliery proprietors to be firm at late rates. Good burgy at the pit's month is quoted at 3s. 9d. to 4s. 3d., and good slack at 3s. 6d. to 3s. 9d. per ton.

There is very little inquiry for coal for shipment, and for steam coal, delivered at the High Level, Liverpool, or at Garston, sellers are not able to command much more than 6s. per ton.

Coke is still quoted at about 10s. to 13s. per ton at the ovens, but there is only a very limited demand.

In the iron trade there is no improvement, and local makers are offering at very low figures, without, however, securing much new business. For Lancashire pig iron, delivered into the Manchester district, makers are now willing to take 47s. 6d. per ton, less 2½ per cent., but there is so little being sold that a further considerable reduction of the output is in contemplation. For Lancashire bars, delivered into the Manchester district, prices now range as low as £6 5s. to £6 10s. per ton.

THE SOUTH STAFFORDSHIRE COAL AND IRON TRADES.

(from our own correspondent.)

The coal trade is the subject of much discussion at the present time in this district. Though for several qualities there exists a fair demand, nevertheless there is a great want of unanimity amongst sellers. The complaints of underselling which were rife prior to the drop are again raised, and much mischief is caused by a few of the minor local colliery owners offering the cheaper sorts at rates below those quoted by the leading producers. Instances of this practice are most numerous with the owners of some of the shallow pits, and whose coals are mostly suited to ironmaking purposes. The great diminution in the number of furnaces in blast having caused a falling off in the demand for ironmaking coal, as well as for

qualities used in the forge, is the only assignable reason; though it may be also accounted for by the fact that local colliery owners are eager to keep the supply in their own hands, and prefer to sell at reduced rates rather than share the trade with the Cannock Chase masters. In forge coal, the difference made is as much as 1s. 6d. per ton. In other respects things are looking in much the same condition as they were prior to the reduction, which it may be stated has not caused any perceptible change in the demand, though an increased business was confidently looked for. There are those who hold that a further reduction will yet be made, notwithstanding the unusually low figures now quoted; but this, it may fairly be said, will not take place at present, if indeed at all. Only a slight difference marks the present prices with those of a year ago, when they were considered to be as low as it was possible to bring them. For all the better qualities the call continues good, and most of the deep collieries are working full time. The Directors of the Cannock and Huntingdon Colliery Company, Limited, have just issued a report to the Shareholders in which it is set forth that operations will in all probability be so far completed as to have reached deep coal by June, 1883, and a further increase of capital to the amount of £20,000 is advised.

The strike which has existed amongst the miners in the Rowley district has been brought to a close, and nearly all the men have returned to work. The result was brought about by means of a conference between masters and men, at which it was agreed that a reduction of 3d. per ton on cobbles and 1d. on coal should be made. The terms as now arranged are—Cobbles, 10d. per ton; coal, 1s.; slack, 4d. Considerable discussion is taking place amongst colliery proprietors in this district on the terms of the Employers Liability Bill, and at a meeting of the South Staffordshire Institute of Mining Engineers, held during the past week, a resolution was passed to give it strenuous opposition.

Little business was done in the iron markets during the week, and but a limited number of sellers and buyers were in attendance. The inquiries from abroad were few, and such parcels as changed hands were small, and unimportant. Perhaps the principal buyers were speculators who have customers in view. Marked bars are firm at £8; good medium, £6 10s; though there is plenty of good merchant iron to be had at £6. Common pigs are offered as low as £1 17s. 6d., and better sorts at £2 5s. All-mine hot-air pigs stand at £4, and part-mine at £3. Girder and boiler-plate buyers are numerous, and prices are firm; but hoops, nail-rods, and angles are a slow sale. Galvanizers sheets are in good request, and prices are very firm. Manufacturers of finished iron continue to work full time, though the number of blast furnaces continues to decrease. It is indeed questionable if there are more than half the number of furnaces going at the present time that were in work at the end of January last. In accordance with the resolution passed by the South Staffordshire and the East Worcestershire blast-furnace proprietors, the men have received notice of 10 per cent. reduction.

THE YORKSHIRE COAL AND IRON TRADES.

(FROM OUR OWN CORRESPONDENT.)

The iron trade is somewhat quieter than it was a short time ago, but many of the works are kept fairly going. The foundries where gas and water pipes are produced are doing about an average business, but there is not over much demand for colliery and other castings, owing to the quiet state of trade. On the other hand, the district furnaces are in full blast, and are for the most part supplied with ore from North Lincolnshire and other places, but little being raised in the district.

Fully an average tonnage of gas coal is being raised and forwarded to various places where the owners have contracts. It is satisfactory to state that the South Yorkshire coalowners have fared very well with regard to the gas coal contracts recently placed. In addition to the 40,000 tons secured by Messrs. Newton, Chambers, and Co., of the Nottingham contract, 7000 tons have been placed with Messrs. Wells, Birch, Ryde, and Co., the owners of the Hoyland Silkstone Collieries, who raise a large tonnage of gas coal. The Darley Main Colliery Company have 5000, Barrow 5000, Edmund's Main 5000, Cooper's 3000, and the Barnsley Silkstone 3000 tons, making a total of 68,000 tons out of the 100,000 tons required.

House coal continues remarkably quiet, whilst prices are lower than they have been for several years past. The rate at which Silkstones have been supplied to consumers in London—21s. per ton—will not allow the owners to receive more than 7s. to 7s. 6d. per ton at the pits. The tonnage to London and the South has of late been very moderate, the coalowners contending that the rate, which amounts to 8s. 3d. per ton, including City dues, prevents them competing with seaborne coal. Several unsuccessful attempts have been made to induce the Directors of the Great Northern Railway Company to lower the tariff; but it is rumoured that the matter is being again considered, and there is some chance of a re-arrangement being come to. The quantity passing over the other lines to Lincolnshire, the Eastern Counties, and various West Riding towns, is only limited.

The steam coal trade is about the only branch where anything like activity is being displayed. A very fair quantity is being forwarded to Grimsby, where the owners enjoy extra facilities. There is also a good deal sent to Hull for exportation to the Baltic and other parts. The chief feature in connection with this branch of trade is the projected Hull and Barnsley Railway, the promoters of which pledge themselves to carry coal from South Yorkshire, and place it on board at 2s. 7d. per ton; the rate from South Yorkshire at the present time being 3s. 1d., and from Normanton or the West Riding 2s. 2d. per ton. The Bill is, however, being severely opposed.

Makers of coke are, notwithstanding the great increase in the output brought about by the erection of new ovens, doing a good business. Some important contracts have been placed in North Lincolnshire, where of late a large number of blast furnaces have been called into requisition.

The various railway companies who have contracts at the district collieries are taking a good deal of locomotive coal. To what extent the local collieries have participated in the contracts for supplying the Midland Railway, or what are the prices, has not transpired; but it may be stated that some collieries which tendered at a low figure have had their tenders returned.

THE COAL AND GENERAL TRADES OF THE NORTH OF ENGLAND.

(FROM OUR OWN CORRESPONDENT.)

The gas coal trade of the county of Durham has gone on upon an ordinary summer's average shipment over the past fortnight. The best collieries are shipping to the Continent, and are completing the ordinary contracts coastwise. They alter very little in the quantities they put into the open market. The outputs, as a rule, had been contracted for early in the year. They have few coals at any time to sell at the best pits. Second-class gas coals are not changed in value, and the demand is moderate. The inquiry for coke has improved. A contract was made for 15,000 tons of coke last week. Some new contracts were under negotiation. Prices are a little stronger than they have been, and there is an improvement in the business doing for steam coals. They are about 6d. per ton lower than they were. Manufacturing coals stand better in the shipping market. There is an increase in the cargoes which are sent overseas to the Baltic, and to the Continent generally.

The tonnage to hand has been pretty abundant, and rates have been low. The shippers still command the market. Handy little sailing vessels have loaded gas coals for the Channel ports, and to inland and the eastern counties. Very little extra business has been done by steamers loading coal for London, over and above the regular gas companies boats which ply weekly to the Thames. What steamers have been freighted to London have had to do so at low rates. The Irish gas-works seem to have made up their supplies for the moment. No more sailing ships were chartered thence with gas coals last week.

The iron trade of the North is, if anything, a little better. The improvement is hardly perceptible. At the same time, however, it seems to have touched the bottom, and is beginning to work upwards again. The demand for chemicals is very quiet. The effect of over-speculation in the early part of the year is still keenly felt in this trade. The price of every description of chemicals is low. Lead is about 10s. a ton down from last quotations. The demand for copper shows an improvement. The timber trade is dull. Speculators find it impossible to force prices up in the trade, and the business that is transacted is for immediate use. The shipments of best fire-bricks and fire-clay goods continue. There is a falling away in the exportation of second-class sorts.

TRADE NOTES FROM SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

The annual general meeting of the Falkirk Joint Stock Gas Company, Limited, was held on the 1st inst.—Mr. T. Kier, of Linns, Chairman of the Directors, presiding. The Secretary, Mr. A. Allan, read the annual report and balance-sheet, which showed the Company's affairs to be in a very satisfactory condition. In consequence, however, of a large recent expenditure in extensions and upon new apparatus, the Directors did not deem it advisable to recommend a higher dividend than 5 per cent. on the preference shares and 4 per cent. on the ordinary stock. On the motion of the Chairman, seconded by Mr. W. Learmouth, Edinburgh, the report was unanimously adopted, and a dividend was declared in terms of the recommendation of the Directors.

The annual general meeting of the Shareholders of the Stonehouse Gaslight Company was held last Wednesday—Mr. W. Craig in the chair. A report was submitted by the Clerk, which stated that the works and street-mains were in a fair state of repair. The yield through the station-meter was considered satisfactory, being 6000 cubic feet of gas per ton of coal, at an average price of 14s. per ton; but the consumers meters did not show the same results, their indications being only 6000 cubic feet per ton of coal carbonized, thus making a loss of 25 per cent. These results, however, were very much more satisfactory than in former years. [Stonehouse, it should be mentioned, is in a mining district in the Middle Ward of Lanarkshire.] The price of gas was continued the same as last year—namely, 6s. 6d. per 1000 cubic feet. It was resolved to declare a dividend of 5 per cent. on the past year's transactions. Important extensions are about to be made to the works.

At the annual general meeting of the Shareholders of the Kinross and Milnathort Gaslight Company, held last Wednesday, it was resolved to declare a dividend at the rate of 5 per cent., and to appropriate a large portion of the surplus funds in the reduction of the debt existing on the Company's works. Mr. G. Laing was unanimously re-elected Secretary and Treasurer to the Company.

After careful inquiry, the Commissioners of Northern Lighthouses have, with the sanction of the Board of Trade, decided to adopt Keith's patent mineral oil gas-works in connection with the driving of two large gas-engines to work the new fog signals at Langness, Isle of Man; and Messrs. Stevenson, Edinburgh, the Engineers to the Lighthouse Board, have just completed the final arrangements with the inventor and patentee, Mr. J. Keith, of Edinburgh and Arbroath, to proceed with the work immediately. The work is being specially constructed by Mr. Keith for the purpose, at a cost of £1000.

The usual quarterly meeting of the Clyde Lighthouse Trustees was held last Wednesday, and from the minutes which were submitted on that occasion by the Committee of Management and Finance, it appeared that as the illuminated buoy on Rosneath Patch had been highly satisfactory, it was suggested that it deserved consideration whether it should not only be continued at Rosneath, but that similar buoys should be placed at Garvel Point in lieu of the lightship there, and also at Skelmorlie Bank. Estimates had been obtained for these extra gas buoys, and also for the erection of gas-works. Inquiry was to be made as to obtaining a convenient site for gas-works at Port Glasgow, and the consideration of the estimates was meantime delayed.

It has been resolved to form a special water supply district for the parish of Barry, including Carnoustie, Forfarshire. Mr. J. F. Bateman, C.E., London, has reported favourably on what is known as the Brax water scheme, and Mr. J. Falconer King, City Analyst, Edinburgh, has reported in favour of the quality of the water. Mr. A. M'Culloch, C.E., Dundee, has been appointed the Engineer to carry out the scheme.

The Local Authority of Dalserf have concluded arrangements with the Bothwell Local Authority for a supply of water at 3d. per 1000 gallons. Contracts for the necessary pipes and for the laying of the same have been made, and operations will be commenced immediately.

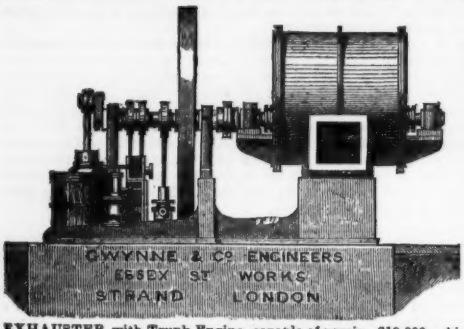
There was an advance in the price of pig iron from day to day in the Glasgow market up till last Thursday, when, amidst considerable excitement, a large amount of business was done up to 47s. 6d. cash per ton. From that point a very rapid reaction set in, and on Friday afternoon the close was sellers at 46s., and buyers at 45s. 10½d cash and one month—7d. per ton better than on the preceding Friday. An advance of 1s. per ton has been announced in the price of one or two brands of makers iron, but the values in the market are practically unaltered.

The coal market is exceedingly dull, and prices are very low.

TODMORDEN GAS COMPANY.—The tenth annual meeting of this Company was held on the 31st ult.,—A. Ormerod, Esq. J.P., in the chair. The accounts of the Company for the past year were presented, as also the Auditor's report. The accounts showed the total receipts for the year to have been £6928 17s. 1d. Bad debts were written off amounting to £140; £100 was set aside as the nucleus of a depreciation account, and there remained as profit £2379 18s. 7d. Out of this sum the Directors recommended the payment of a dividend of 9 per cent. on the consolidated stock (£18,775), and 7 per cent. on the amount called up of the £10 share capital. These dividends, with £68 16s. for interest due on share capital paid in advance, would absorb £2020 1s. 5d., leaving a balance of £359 17s. 2d., which the Directors recommended should be carried to the reserve-fund account. The Company's works and distributing plant were reported to be in good working condition, and more than equal to the present requirements. The capital and liabilities of the Company (including the year's profit) were estimated in the balance-sheet at £34,719 14s. 1d. The various recommendations of the Directors were agreed to, and the three retiring Directors (Messrs. Halstead, Barker, and Ashworth) and one of the Auditors (Mr. C. Lord) were re-elected.

The GRAND MEDAL of MERIT at the VIENNA EXHIBITION, TWO MEDALS at the PHILADELPHIA EXHIBITION and TWO MEDALS at the PARIS EXHIBITION, have been AWARDED to GWYNNE & CO. for GAS-EXHAUSTERS, ENGINES, and PUMPS; Also 27 OTHER MEDALS AWARDED at all the GREAT INTERNATIONAL EXHIBITIONS.

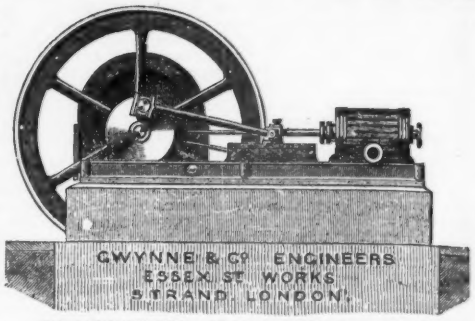
GWYNNE & BEALE'S PATENT GAS-EXHAUSTERS & ENGINES.



EXHAUSTER with Trunk Engine, capable of passing 210,000 cubic feet per hour.

The Judges report on the combined Exhauster and Steam-Engine exhibited at the Philadelphia Exhibition is—"*Reliable compact Machine, well adapted for the purpose intended, of excellent workmanship.*"

GWYNNE & CO. have made the largest and most perfect Gas-Exhausting Machinery in the world, and have completed Exhausters to the extent of 8,000,000 cubic feet passed per hour, of all sizes from 2000 to 210,000 cubic feet per hour.



52,500 EXHAUSTER, with Horizontal Engine combined.

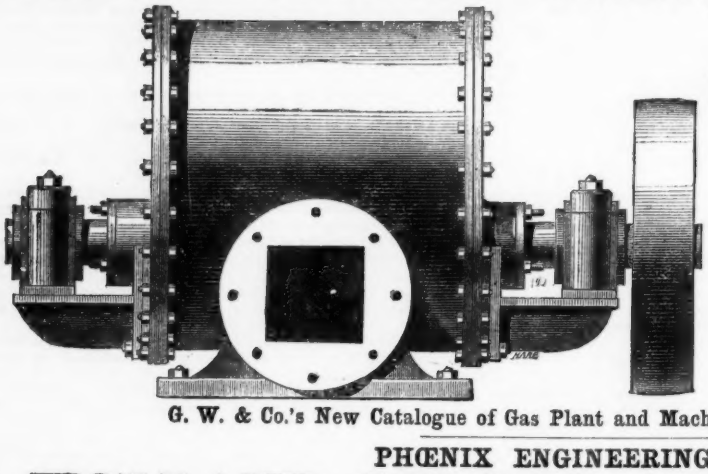
GWYNNE & CO. do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, *but to produce machinery of the very highest quality, and most approved design and workmanship.* The result is that in every instance their work is giving the fullest satisfaction. Numerous testimonials and references can be given to Companies using their Machinery for years past.

Exhausters, with or without Engines combined, can be made to pass the gas WITHOUT OSCILLATION OR VARIATION IN PRESSURE Regulators, Bye-Passes, Stop-Valves, Gas-Valves, Station Governors, and Gas Machinery of all Sizes.

PLEASE ADDRESS IN FULL, GWYNNE & CO., Hydraulic and Gas Engineers, ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON, W.C., ENGLAND.

Gwynne & Co.'s New Catalogue on Gas-Exhausting and other Machinery may be obtained on application at the above Address.

BEALE'S IMPROVED PATENT GAS EXHAUSTERS,



WITH OR WITHOUT

WROUGHT-IRON SPINDLES AND

ENGINES COMBINED.

GEORGE WALLER & CO.,

MAKERS OF

ENGINES, EXHAUSTERS,
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HYDRAULIC MAIN VALVES,
BYE-PASS VALVES,
TAR, LIQUOR, AND OTHER PUMPS,
SCRUBBERS AND PURIFIERS,
CONDENSERS, BOILERS, &c.

G. W. & Co.'s New Catalogue of Gas Plant and Machinery can be had on application.

PHŒNIX ENGINEERING WORKS:

HOLLAND STREET, SOUTHWARK, S.E.

WANTED, Readers of the NEW Edition, "Cooking & Heating by Gas;" on Burners, &c. Copies, by post, Threepence, direct from the Author, MAGNUS OHREN, Assoc.M.I.C.E., Gas-Works, SYDENHAM.

TO ENGINEERS AND MANAGERS.

WANTED, by a steady Man, a permanent Situation as BRICKLAYER and RETORT-SETTER. Seven years good reference. Apply to T. B. H., 34, Cheapside, SITTINGBOURNE.

WANTED, by the Advertiser, a Young Man aged 25, and Married, a Situation as MANAGER of a small Gas-Works. Applicant has a thorough knowledge of the Manufacture and Distribution of Gas in all its branches. Has had several years experience as Manager of a Works (make 15 millions). Has no objection to go Abroad. Satisfactory reasons for change.

Address No. 663, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

SITUATION wanted as Collector and METER INSPECTOR or any similar capacity in a Country Gas-Works, by an experienced man. Good testimonials.

Address W., care of Mr. Burgess, 5, Denmark Street, CAMBERWELL, S.E.

HOLYWOOD GAS COMPANY, LIMITED.

WANTED, a Manager for the above Works. He will be required, besides taking the general management of the Works under the Chairman and Directors, to take the indications of the Meters. He must be competent to Superintend the Setting of Retorts, Laying of Mains, &c. Security will be required for the due discharge of the duties of the situation.

Salary not less than £90 a year, with house, fire, and light.

Applications, with testimonials as to character, ability, and experience, to be forwarded to the Chairman of Directors on or before the 28th inst.

THOMAS HUNTER, Secretary.

Holywood, Belfast, June 10, 1880.

WANTED, Plans and Tenders for the Erection of Gas-Works to supply about 2200 cubic feet per 24 hours.

Address GRAHAM, MAXWELL, and FAIRLIE, SILLOTH.

WANTED, the following Second-hand PLANT:—

A SCRUBBER, about 12 ft. high, 3 ft. 6 in. wide, with Water Tank and Distributing Apparatus, and 6-in. Connections and Four-Way Valve.

A PURIFIER, about 9 ft. by 6 ft., and 4 ft. deep, with Sieves, Lift, 6-in. Connection, and Four-Way Valve.

Price, &c., to be addressed to GEO. WHITMAN, Company's Office, Aspley Guise, near WOBURN.

GAS SHARES FOR SALE—Ten £5 SHARES of the Hawick Gas Company, guaranteed dividend 10 per cent., payable yearly on the 26th of May.

Address offers to No. 666, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FOR SALE—A Second-hand Square STATION-METER, to pass 40,000 cubic feet per hour. Erected about 12 years. Made by Messrs. J. and J. Braddock, Oldham. Now in use at the Plymouth Gas-Works. To be removed to make place for a larger sized Meter. To be sold a bargain.

For price and particulars apply to W. W. ANDREWS, 238, Kingsland Road, LONDON.

FOR SALE.

GASHOLDER Sheets and Framing, 40 ft. diameter by 16 ft. deep; capacity about 17,000 cubic feet. In excellent condition. Will stand well to be Re-erected.

Iron Roof, 65 ft. long by 27 ft. span. Inside walls in good condition.

Hydraulic Main, Cast Iron, 22 in. deep by 20 in. wide and about 61 ft. long.

Apply to Subscriber, Montrose Gas-Works.

ROBERT RENTON, Manager.

June 12, 1880.

THE Redcar Gas Company have for Immediate Sale in excellent condition the complete PLANT of a discontinued Gas-Works capable of making up to 20 millions, any portion will be sold separately, comprising:—Gasholder, four Purifiers with Centre Valve and Connections, Scrubber, Condensers, Station Meter, Governors, Inlet and Outlet Pipes, Retort Fittings, Hydraulic Mains, &c.

Further particulars may be had on application to the undersigned.

M. FLIGG, Secretary.

THE Gloucester Gas Company, ceasing to manufacture gas at their old works, will have the undermentioned APPARATUS for Sale about the beginning of August, viz.:—

About 150 feet of D-shape Wrought-Iron Hydraulic Main, size 19 in. by 19 in. Also about 38 ft. of D-shaped Wrought-Iron Hydraulic Main, size 20 in. by 20 in. Annular Condenser, consisting of six Vertical Pipes, 24 in. diameter, 19 ft. high, with three 12-in. Slide-Valves and 12-in. Connections.

Scrubber (round), 5 ft. by 20 ft., with three 12-in. Slide-Valves, and 12-in. Connections.

Exhauster (Jones) to pass about 15,000 feet per hour.

Exhauster (Beales) to pass about 25,000 feet per hour.

Two Vertical Steam-Engines, each about 6-horse power with Pulleys, and Shafting used for driving the above.

Boiler 14 ft. 6 in. by 3 ft. 6 in., with Centre Tube, and four Galloway Patent Tubes.

4-horse power Horizontal Steam-Engine.

Three 4-in. Pumps, with cranked Shafting and a pair of Mitre Wheels.

Two Purifiers, 16 ft. by 8 ft., with six 12-in. Slide-Valves and 12-in. Connections.

Gasholder, Double Lift, with Cast-Iron Tank, capacity 37,000 feet.

Gasholder, Double Lift, capacity 100,000 feet.

Gasholder, Double Lift, capacity 240,000 feet.

One 12-in. Governor, by Wright, London, with 12-in. Valves, Bye-Pass, and Connections.

Two 12-in. four-way faced Valves, by Cockey.

For further information, &c., apply to the undersigned.

R. MORLAND, Engineer.

PURIFIERS for Sale, Cheap.—Two 8 ft. by 4 ft. by 4 ft., with all Connections and Hydraulic Valves for working either one or both. T-iron Ball and Lifting Screw complete. Or the Covers, which are as good as new, of 10 B. W. Gauge, would be sold separate.
Apply to L. Monk, Manager, Gas-Works, Lanark, N.B.

GAS PLANT FOR SALE.

THE Committee of the Burton-on-Trent Corporation Gas Department have for Sale One Set of TWO PURIFIERS, 24 ft. by 10 ft., 3 ft. 9 in. deep, 12 in. Connections, and Two 12 in. Four-Way Dry Valves by Walker, Lifting Apparatus, &c.
One Set of TWO PURIFIERS, 14 ft. by 14 ft., 3 ft. 9 in. deep, and Six 12-in. diameter Valves by Young, Lifting Apparatus.
The above having been replaced by larger can be removed at once.
Further particulars may be had on application to the undersigned.
John Mudie, Manager.
Gas-Works, Wetmore Road, June 5, 1880.

GAS APPARATUS FOR SALE.

THE Gas Committee of the Town Commissioners of Newry are desirous of receiving TENDERS for the Purchase of the following PLANT, which has been taken down to be replaced with apparatus of a larger size:—
8-in. Condensers, 20 pipes, and Tar Box with overflow-pipes complete.
Five 8-in. Rack-Valves and 8-in. Connection Pipes and bends for Bye-pass complete.
Two Purifiers, 10 ft. by 12 ft. by 4 ft. deep.
Two Purifiers, 8 ft. by 8 ft. by 4 ft. deep.
8-in. Connections, Lift, Screws, and Travellers. One Hydraulic Centre-Valve suitable for four purifiers.
Tenders to be forwarded to the undersigned.
John Kernaghan, Secretary of Gas Committee.
Board-Room, 6, Marcus Square, June 9, 1880.

GAS PLANT FOR SALE.

THE Coventry Gas Company have for SALE—
SCRUBBERS.—One 5 ft. 6 in. diameter, 15 ft. high. One 5 ft. diameter, 20 ft. high; with or without 8-in. Connections and Valves.
STEAM-JET VENTILATOR.—One No. 2 Körting's Patent Jet Ventilator, with Chest. One No. 3½ Körting's Patent Jet Blower.
VALVES.—Two Cockey's Dry Central Valves for four Purifiers. One 12-in. Cathels's Four-way Valve.
The above are being replaced by larger apparatus, and can be removed at once. Also a 100-light Gas Apparatus (Porter's make); this includes a Gasholder, 14 ft. diameter and 10 ft. high, which could be sold separately.
For particulars and prices apply to
W. L. Robinson, Manager.
Gas-Works, Coventry, April 17, 1880.

GAS PLANT FOR SALE.

THE Maidstone Gas Company having enlarged their Works, offer the following Apparatus for Sale in good condition:—
SCRUBBERS.—One Tower Scrubber 30 ft. high by 10 ft. diameter, with Distributor, and partly fitted with Livesey's boards.
CONDENSERS.—One Set of Annular Condensers, consisting of 9 Pipes 17 ft. high, outer diameter 2 ft. 6 in., fitted with 12-in. Valves complete.
ENGINES.—Two 12-Horse Power Horizontal Engines in very good condition.
STATION-METER.—By Milne and Son, in first-class condition, ornamental case, with Valves and Bye-pass complete; to pass 20,000 cubic feet per hour.
HYDRAULIC MAIN.—Six 8 ft. by 18 in. Hydraulic Main D wrought iron; 24 8 ft. 9 in. by 18 in. Hydraulic Main D wrought iron. Nearly new.
BRIDGE AND ASCENSION PIPES.—90 6 in. by 4 in. Bridge-Pipes, and a quantity of 6-in. Ascension-Pipes and Bends.
RETORTS.—31 Rounds, 15 in. diameter and 9½ ft. long, in two pieces. 2 Ovals, 21 in. by 15 in. and 9 ft. long, in one piece. All of Stourbridge Fire-Clay, and in good condition.
For further particulars and price apply to
John West, Engineer and Manager,
Gas Works, Maidstone, April 21, 1880.

SECOND-HAND ENGINES, EXHAUSTERS, BOILERS, &c.

THE Scarborough Gas Company invite OFFERS for the Purchase of their present Duplicate Exhausting Machinery, comprising Two 7-in. Cylinder by 14-in. Stroke Horizontal Steam-Engines; Two 20,000 cubic feet per hour Gwynne and Beale's Patent Exhausters; Two Hydraulic Governors in Connection with Throttle Valves of Engines; and Two Cornish Boilers, 11 ft. by 3 ft. 9 in.
The whole are of superior make and have been carefully used, and are well worth attention, being about to be removed for replacement by larger and more powerful apparatus.
The machinery may be seen in operation until the 30th of April, and further particulars may be obtained on application to the undersigned.
By order,
William J. Moon, Manager.
Scarborough, March 5, 1880.

STAFFORD CORPORATION—GAS DEPARTMENT.

THE Committee are desirous of receiving TENDERS for the following, viz.:—
1 A Cast-Iron Tank, 40 ft. by 20 ft. by 5 ft.
1350 Yards of 4-in. cast-Iron S and S Pipes, each Pipe to weigh 1 cwt. 1 qr. 14 lbs.
650 Yards of 3-in. Cast-Iron S and S Pipes, each pipe to weigh 3 qrs. 18 lbs.
Plans may be seen and further particulars obtained on application to the Manager, Mr. Jno. Storer.
Sealed tenders, addressed to the undersigned, and endorsed "Tender for Tank, &c.," to be sent in on or before the 22nd of June.
The Committee do not bind themselves to accept the lowest or any tender.
By order,
Jno. Storer, Manager.
Gas-Works, Stafford, June 8, 1880.

THE Sheffield United Gaslight Company OFFER for SALE the following lots of Retort-House FITTINGS, which they are now taking down at two of their Stations:—
54 Pieces Cast-Iron Hydraulic Main, U-shaped, 9 ft. 6 in. by 18 in. by 18 in.
16 Pieces Cast-Iron Hydraulic Main, U-shaped, 9 ft. 6 in. by 18 in. by 15 in.
4 Pieces Cast-Iron Hydraulic Main, U-shaped, 9 ft. 6 in. by 16 in. by 15 in.
320 Cast-Iron Mouthpieces, D-shaped, 21 in. by 15 in.
160 Lengths 4-in. Cast-Iron Ascension-Pipes, straight, 7 ft. 6 in. long.
215 Lengths 4-in. Cast-Iron Ascension-Pipes, straight, 5 ft. 6 in. long.
50 Lengths 4-in. Cast-Iron Ascension-Pipes, curved, 5 ft. 6 in. long.
60 Lengths 4-in. Cast-Iron Ascension-Pipes, curved, 2 ft. 8 in.
37 Lengths 4-in. Cast-Iron Ascension-Pipes, curved, 10 ft. 2 in.
40 Lengths 4-in. Cast-Iron Ascension-Pipes, straight, 5 ft. 10 in.
17 Lengths 4-in. Cast-Iron Ascension-Pipes, straight, 5 ft. 5 in.
431 Lengths 4-in. Cast-Iron H-Pipes.
506 Lengths 4-in. Cast-Iron Dip-Pipes.
The above apparatus has been in use up to a recent date, and is adapted for re-erection.
The Company will be prepared to receive an offer for the whole or any portion of the above. Price £4 per ton, loaded into trucks at Sheffield.
Applications to be addressed to the undersigned.
Thos. Roberts, Manager.
Gas Office, Sheffield, March 25, 1880.

BOROUGH OF HALIFAX.

THE Gas-Works Committee of the Corporation are prepared to receive TENDERS for the Purchase of the surplus GAS TAR (about 1500 tons) up to April 30, 1881.
Further information may be obtained on application to Mr. Wm. Carr, Engineer, Gas-Works, Halifax; and tenders, properly endorsed, must be sent to me on or before Thursday, June 24, 1880.
By order,
Keighley Walton, Town Clerk.
Town Hall, Halifax, May 28, 1880.

BOROUGH OF HALIFAX.

THE Gas-Works Committee of the Corporation are prepared to receive TENDERS for the Purchase of the whole of the AMMONIACAL LIQUOR manufactured on their premises for a period of Two, Three, or Four years. The Liquor to be delivered either into railway tanks or canal barges as the Contractor may desire.
Further particulars and forms of tenders may be obtained on application to Mr. Wm. Carr, Engineer, Gas-Works, Halifax, and tenders, properly endorsed, must be sent to me on or before Thursday, June 24, 1880.
By order,
Keighley Walton, Town Clerk.
Town Hall, Halifax, May 28, 1880.

THE Directors of the Pangbourne Gas Company invite TENDERS for the Construction of a BRICK TANK and GASHOLDER complete, to contain about 5000 cubic feet. The Works are close to the Pangbourne Station of the Great Western Railway.
Particulars may be obtained of Mr. A. Butler, the Secretary, Pangbourne, near Reading, Berks.
June 9, 1880.

CITY OF LIMERICK WATER SUPPLY.

SPECIAL NOTICE TO ENGINEERS.

THE Town Council of Limerick hereby give notice that the time for receiving PLANS, &c., for the Construction of these Works as heretofore advertised, is extended from the 15th of July next to the 1st of September next.
By order,
John Ellard, Town Clerk.
Town Hall, Limerick, June 3, 1880.

SOUTH DUBLIN UNION.

TO GAS ENGINEERS AND OTHERS.

THE Guardians of the above Union invite PLANS and TENDERS from competent persons for the CONSTRUCTION of GAS-WORKS on the Workhouse premises for the Supply of Gas to the Workhouse.
Information as to the site of the proposed Works, the annual consumption of Gas, and all other particulars, can be had on application to the Master of the Workhouse.
Sealed tenders, accompanied by plans, to be left with me here, not later than 11 o'clock a.m., on Thursday, the 17th of June, on which day they will be opened by the Board.
The Guardians do not bind themselves to accept the lowest or any other tender.
By order,
Arthur Percy Stokes, Clerk of the Union.
Board Room, James's Street, Dublin,
May 29, 1880.

MANCHESTER CORPORATION GAS-WORKS.

TO TAR DISTILLERS AND OTHERS.

THE Gas Committee are prepared to receive TENDERS for the Purchase of the whole or a portion of the GAS TAR to be produced at their Gaythorn and Rochdale Road Works during a period of Three or more years, commencing on the 1st day of March, 1881.
Sealed tenders, addressed to the Chairman of the Gas Committee, Town Hall, Manchester, and endorsed "Tender for Gas Tar," must be delivered here on or before Wednesday, the 16th day of June next.
The Committee do not bind themselves to accept the highest or any tender.
Further particulars and forms of tender may be obtained on application to Mr. Geo. B. Jackson, at the Gas Office.
By order,
Jos. Heron, Town Clerk.
Town Hall, Manchester, May 15, 1880.

ILKESTON GAS-WORKS.

CONTRACT No. 2.—PURIFIERS, &c.

THE Ilkeston Local Board are prepared to receive TENDERS for the Work to be done in the Construction and Erection of Four Cast-Iron PURIFIERS with Valve Connections and Travelling Lifting Apparatus for their Gas-Works, Rutland Street, Ilkeston.
Plans and specifications may be seen, and forms of tender and quantities obtained of the Manager at the Works.
Sealed tenders, endorsed "Tender for Purifiers," must be sent to me on or before Friday, June 25, 1880.
The Board do not pledge themselves to accept the lowest or any tender.
By order,
Wright Lissett, Clerk to the said Board.
Town Hall, Ilkeston, June 5, 1880.

GAS EXPLOSIONS.

THE LAW UNION FIRE AND LIFE INSURANCE COMPANY, of No. 126, Chancery Lane, London, grants Policies of Insurance on Gas-Works, and Buildings connected therewith, which cover risk of explosion and spontaneous ignition of Coal, on very advantageous terms. Full particulars will be sent post free on application to
Frank M'Gedy, Secretary.
126, Chancery Lane, London.

IMPORTANT to GAS COMPANIES.

Messrs. JOHN ABBOT & CO., Limited,
of Suffolk Lane, London, and Gateshead,
Manufacture and Erect
SULPHATE PLANT
On the most Modern and Improved Plan.
EXAMPLES
Can now be seen at
NEWCASTLE, CARLISLE,
And will shortly be erected at the New Gas Works,
TUNBRIDGE WELLS.

Price 28s. each, handsomely bound in Morocco, cloth sides, gilt edged and lettered.
THE FIRST AND SECOND VOLUMES
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KING'S TREATISE
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COAL GAS.
Edited by THOS. NEWBIGGING, C.E., M.Inst.C.E., and W. T. FEWTRELL, F.C.S.
Orders received by
Walter King, 11, Bolt Court, Fleet Street, London, E.C.

Now ready, price 18s., bound in cloth, gilt lettered,
THE THIRTY-FOURTH VOLUME
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CLOTH CASES, GILT LETTERED,
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BOX'S PATENT STREET GAS-LAMP

Has the following good qualities:—
1. No putty or other material is required for glazing. Thus there is no hacking out of old putty on removal of the glass, with the *consequent damage* to the lamp frames. 2. No liability to breakage by unequal expansion of the glass caused by changes of temperature. 3. Any inexperienced workman can glaze the lamp in a few minutes. 4. The system of glazing can be applied to any existing lamp at a trifling cost. 5. It is cheap, strong, and durable. 6. The glass can be easily removed so that the frames can be thoroughly painted inside and out.
The lamp may be supplied fitted with clear opal or ribbed glass, *as also with enamel tops* if required. The necessary fittings for altering existing lamps to this system can be supplied at moderate prices and a small charge for royalty. Licences granted on the most reasonable terms. For further particulars apply to the Patentee,
W. W. Box,
Gas-Works, Crayford, Kent.

BRITISH ASSOCIATION of GAS MANAGERS
VISIT TO BECKTON,
JUNE 10, 1880.

Copies of Photographic Groups taken on the above occasion may be had at the following rates, post free:—

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Larger Sizes for Framing, 3s. 6d. each.
Apply to
F. WELLS, Wakering Road, Barking, Essex.

Imperial METER COMPY.,
LIMITED,
Makers of THE IMPROVED DRY GAS-METERS, THE PATENT WET GAS-METERS, Special Meters for Public Lighting, STATION-METERS, Governors, &c.
KING'S ROAD, ST. PANCRAS.
Formerly also (**Walter Ford**) at Gray's Inn Road.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.
Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.
Patents procured for Foreign Countries.
Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 22, Great George Street, WESTMINSTER.

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FAMILY GAS KITCHENERS, HOTEL GAS RANGES, ARTIZANS & COTTAGE GAS COOKERS, BREAKFAST GRILLERS, &c. GAS BATHS, CIRCULATING GAS BOILERS, ASBESTOS FIRES, AND CHEERFUL HEATING STOVES.

286, 288, & 290, CAMBERWELL ROAD, LONDON, S.E.

W. C. HOLMES & Co.,
ENGINEERS AND CONTRACTORS
FOR
GAS AND WATER-WORKS,
WHITESTONE IRON-WORKS,
HUDDERSFIELD.

REFERENCES TO UPWARDS OF 400 WORKS.

E. & W. H. HALEY,
IRONFOUNDERS & MAKERS OF
CAST-IRON PIPES
FOR
GAS, WATER, & STEAM.

LISTER HILLS FOUNDRY, BRADFORD, YORKSHIRE.

WOOD TROUGHING
For Preserving Service-Pipes.
Price from Three-Farthings per Foot.
In any Lengths.
THOS. PROUD,
Brookfield Works, Icknield St., Birmingham.

THOMAS CARR & SON,
MANUFACTURERS OF
FIRE-BRICKS, LUMPS, TILES, RETORTS, &c.,
SCOTSWOOD FIRE-BRICK WORKS, SCOTSWOOD-ON-TYNE.
Also Makers of all kinds of Common Building Bricks, and of Pressed White and Red Bricks for Facing.

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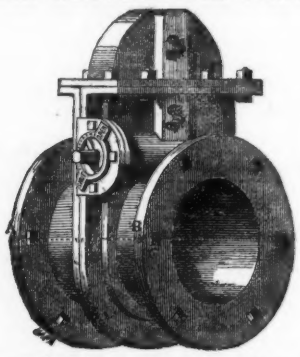
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
WENLOCK IRON WHARF, 21 & 22, WHARF ROAD, CITY ROAD, LONDON, N.
Manufacture and keep in stock at their works (also a large stock in London) PIPES and CONNECTIONS 1½ to 48 inches in diameter; and make to order Retorts, Purifiers, and Tanks, with or without planed joints, Columns, Girders, Special Castings, required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.
NOTE.—Syphons and Covers are joint-faced if required, doing away with millboard and iron boring, or Syphons made without Covers, a socket being cast on and fitted with a small plug about 6 inches in diameter with lead joint. In either way preventing leakage.

Now ready, Second Edition, price 7s., by post 7s. 3d., the
GAS MANAGER'S HANDBOOK.
By THOMAS NEWBIGGING, M.I.C.E.

Orders to be sent to
WALTER KING,
11, BOLT COURT, FLEET STREET, LONDON, E.C.

B. DONKIN & CO.'S
IMPROVED GAS-VALVES
WITH WROUGHT-IRON PINIONS.



These Valves are proved on both sides to 30 lbs. on the square inch before leaving the works, and are kept in stock.
In ordering Valves, please state whether required for under or above ground, and if to be with flanges or spigots and sockets cast on, or with separate spigot and socket pieces.

ALSO MAKERS OF
J. BEALE'S NEW PATENT GAS EXHAUSTERS, STEAM-ENGINES for Driving Gas Exhausters,
VALVES FOR AMMONIACAL LIQUOR, TAR, &c., IMPROVED BRIDGE VALVES for Regulating the Seal in Hydraulic Mains, so arranged that when once adjusted for the proper overflow they can be closed entirely and opened again without altering the adjustment,
GAS THROTTLE-VALVES, SPECIAL GAS-VALVES with Columns, Gauges, &c.
BYE-PASS VALVES, SCREW WATER-VALVES, &c., &c.

B. DONKIN & Co., BERMONDSEY, LONDON, S.E.

Now Ready, Price One Guinea,
PRECEDENTS IN PRIVATE BILL LEGISLATION
AFFECTING GAS AND WATER UNDERTAKINGS.
COMPILED BY MR. G. W. STEVENSON, C.E., F.G.S.
LONDON: WALTER KING, 11, BOLT COURT, FLEET STREET, E.C.

SAMUEL CUTLER & SONS,

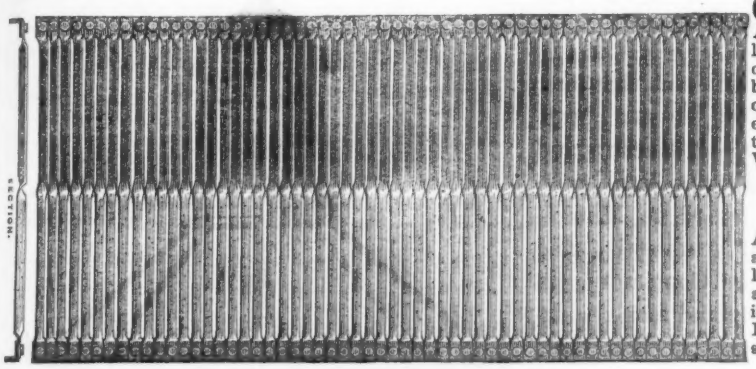
MILLWALL, LONDON, E.,

CONTRACTORS FOR THE

ERECTION OF GAS AND WATER WORKS,

Undertake their ENTIRE ERECTION or EXTENSION in any part of the World, including Small Works for VILLAGES and MANSIONS, as well as of very LARGE EXTENT. Have recently constructed for the PHŒNIX GAS COMPANY the LARGEST GASHOLDER yet erected.

S. C. and SONS supply *every* requisite for Gas-Works, and keep in stock Small Articles, such as BARROWS, SCOOPS, RETORT-LIDS, BOLTS, &c.; and they manufacture WOOD SIEVES of a very superior description.



CUTLER'S PATENT WATER-VALVES

Are the very best possible as PURIFIER VALVES; leakage impossible, most easy to work, never get out of order or the worse for wear, and can, if desired, be very simply arranged to work the whole or a part of a set of Purifiers in any conceivable order whatever. Have already been erected and approved at the London Gas-Works, Nine Elms; Phœnix Gas-Works, Greenwich; Maidstone, Ipswich, &c.

Full Particulars on Application.

CUTLER'S PATENT SIEVES

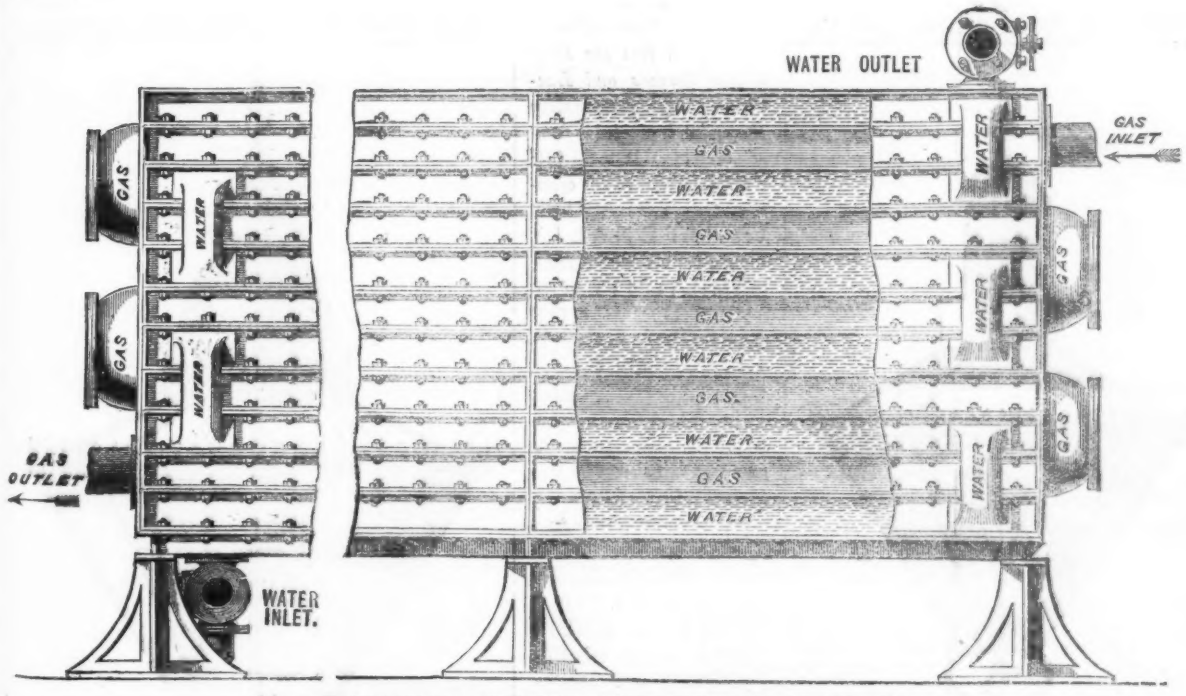
Are the most durable. The sieve bars presenting an inclined plane to the flow of the Gas, offer the least possible resistance, greatly reducing pressure, and permitting contact with every part of the purifying material. Have been supplied to many of the London and Provincial Gas-Works, and give great satisfaction.

Copies of Testimonials on Application.

MORRIS AND CUTLER'S PATENT CONDENSERS

Adopt water as a cooling medium, the respective streams flowing in opposite directions; quantity of water required but small, and being only raised in temperature, is useful for any purpose of the works. The power of Condensers can be regulated at will by the amount of water permitted to pass through. Erected and giving great satisfaction at Brentford, Tunbridge Wells, Maidstone, Buxton, Phœnix Gas-Works, Greenwich; where its advantages may be seen.

Mr. WATES, of Greenwich, has kindly offered to reply to any inquiries addressed to him as to its efficiency.



Also CUTLER'S PATENT MOUTHPIECE SUPPORTS,

AND

CUTLER'S PATENT REMOVABLE DIPS.

[*See* JOURNAL for Nov. 25, 1879.]

WILLIAM SUGG'S
IMPROVED SYSTEM OF STREET LIGHTING,

By PATENT "LONDON" ARGAND and FLAT-FLAME BURNERS, and SHADOWLESS REFLECTING LANTERNS of High Illuminating Power.

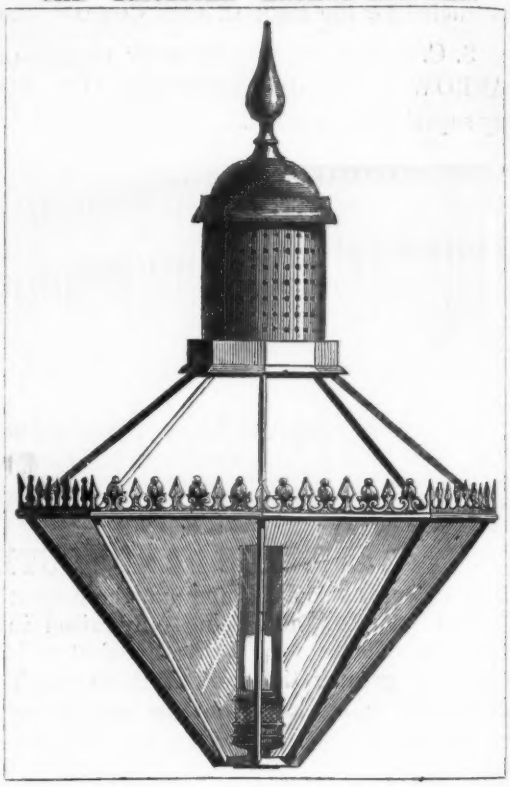
SUITABLE FOR COMMON AND CANNEL GAS.

THE "GLOBE" ARGAND LANTERN.

Upwards of Eighty are now being fixed at the Manchester Central Station of the Cheshire Lines Committee.

The fact that over 1500 of the large Argand Burners and Lakterns have been supplied to Municipal Authorities and Gas Companies in England alone, within a very short time, speaks significantly of the excellence of this system, and the real merits it has been proved to possess.

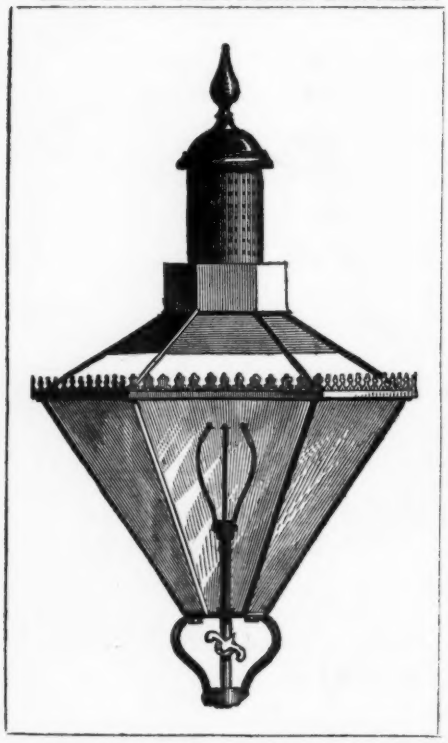
THE "LEICESTER" ARGAND LANTERN.



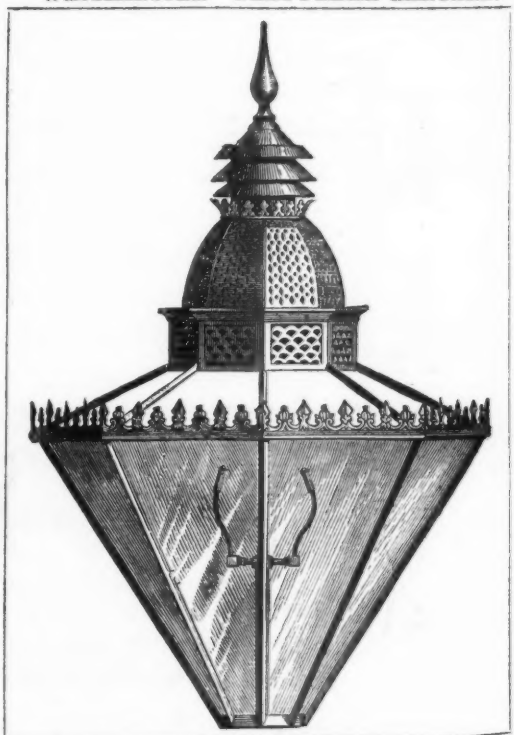
Please Notice.

I beg to call your attention to the fact that the Flat-Flame Burners and Lanterns of high Illuminating Power lately erected in front of the HOUSES OF PARLIAMENT, *opposite the* TREASURY (WHITEHALL), CHARING CROSS, HAMILTON PLACE, *and* GROSVENOR GARDENS (*St. George's Vestry, Hanover Square*), OXFORD CIRCUS, FINSBURY PAVEMENT, *&c., are my patterns, and similar in construction to those recently exhibited at the Birmingham Trial, where the* HIGHEST RESULT IN ILLUMINATING POWER PER CUBIC FOOT WITH FLAT-FLAMES *was obtained by my Burners of this class* (*See* JOURNAL OF GAS LIGHTING, *March* 16.)

THE "LAMBETH" FLAT-FLAME LANTERN.

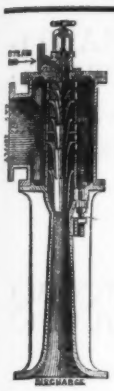


THE "WESTMINSTER" FLAT-FLAME LANTERN.

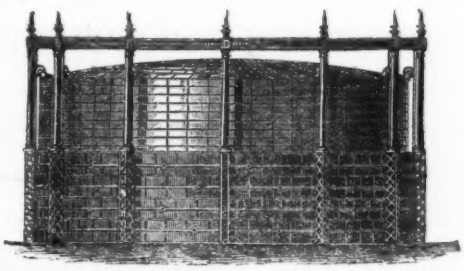


WILLIAM SUGG, ENGINEER, VINCENT WORKS, WESTMINSTER.

THE
THAMES BANK IRON COMPANY,
UPPER GROUND STREET, LONDON, S.E.,
SUPPLY FROM STOCK
CAST-IRON RETORTS AND ALL KINDS OF GAS-WORKS APPARATUS,
SOCKET-PIPES FOR GAS OR WATER PURPOSES,
FLANGE-PIPES FOR STEAM,
RAIN-WATER PIPES AND GUTTERS,
HOT-WATER BOILERS, PIPES, AND CONNECTIONS,
LAMP-COLUMNS, LAMPS, LAMP-FRAMES, WROUGHT TUBES, &c.,
HOT WATER AND HOT AIR APPARATUS,
Erected complete on the most Improved Principles.



KÖRTING'S STEAM-JET EXHAUSTER,
IMPROVED CLELAND'S PATENT.
UPWARDS OF 400 IN USE.
CLELAND'S PATENT SLOW-SPEED CONDENSER, AND CLELAND'S PATENT STEAM SCRUBBER.
FOR PARTICULARS, APPLY TO
KÖRTING BROS.,
17, LANCASTER AVENUE, MANCHESTER,
OR TO
GERALD J. TUPP, Creek Engine-Works,
Middle Mall, Hammersmith, London, W.



HENRY BALFOUR & CO.,
ENGINEERS, IRONFOUNDERS, AND GAS APPARATUS MAKERS,
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Works: DURIE FOUNDRY, LEVEN, FIFE, N.B.
MANUFACTURERS OF
GASHOLDERS, SINGLE OR TELESCOPE, WITH OR WITHOUT COUNTERBALANCE GEAR; TANKS, CAST & WROUGHT IRON.
BOILERS, CONDENSERS, CRANES, EXHAUSTERS AND ENGINES,
GIRDERS (Cast and Wrought Iron), IRON PIPES, PUMPS, PURIFIERS, RETORTS & FITTINGS,
ROOFS, SCRUBBERS, SHAFTING, VALVES, WASHERS.
ANDERSON'S PATENTED INVENTIONS, VIZ.—
FOUR-WAY BYE-PASS VALVES, ENGINES AND EXHAUSTERS, REVOLVING BRUSH SCRUBBERS, GAS-WASHERS, FUEL-MAKING MACHINES, GOVERNORS, &c.
H. B. & Co. undertake Contracts for the Supply and Erection of Gas-Works, either for Towns or Mansions, or the Remodelling of existing Works.
SHIPPING ORDERS receive special attention.
H. B. & Co. having had large experience in this Department, undertake to ship, f.o.b., properly packed and marked for export.
ESTIMATES AND DESIGNS ON APPLICATION.

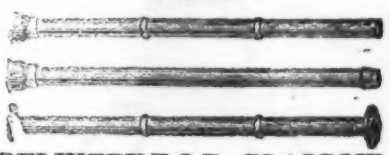
OXIDE OF IRON.

Gas Companies can be supplied with any quantity of Natural Oxide suitable for Gas Purification purposes. Shipped direct from the extensive estates in Co. Donegal of the Earl of Leitrim and Wybrants Olphert, Esq., D.L.

By thus purchasing from the producer a constant supply of the purest material will be ensured to the Gas-Works, and intermediate profits will be saved to the Shareholders.

For terms, references, and particulars apply to
JOHN BEATTIE,
FALCARAGH, Co. DONEGAL, IRELAND.

GAS AND WATER PIPES.
WILLIAM MACLEOD & CO.,
80, ST. ENOCH SQUARE, GLASGOW.
CAST-IRON GAS AND WATER PIPES.



DELIVERY F.O.B., GLASGOW.
Prices on application.

CAN THE HYDRAULIC MAIN BE ABOLISHED?
YES, very easily, by using
WHITE'S AUTOMATIC GAS-VALVE.
HERE'S PROOF:—

Gas-Works, Aberystwith, Jan. 24, 1880.

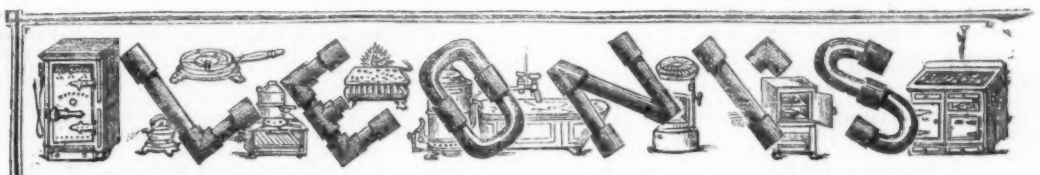
Mr. Wm. White, Abersychan, Mon.
Dear Sir,—The retorts fitted with your Valves answer very well. Our average make is 5600 cubic feet per mouthpiece, and we have no difficulty in producing 16-CANDLE GAS WITHOUT ANY CANNEL; although we formerly (with the old hydraulic dip-pipes) used a percentage to obtain that candle power. During the whole time they have been at work we have not been troubled with a choked ascension-pipe.
Yours respectfully,
J. DOUGALL, Engineer.

Mold Gas and Water Company's Works, Mold, May 28, 1880.

Mr. W. White, Gas Engineer, Abersychan.
Dear Sir,—After two years experience of your "Patent Automatic Gas Valve," which I consider a fair trial, I come to the following conclusions:—
1. That they are perfectly reliable as a complete seal.
2. An almost utter absence of back pressure.
3. Great freedom from deposit of carbon, some retorts not having been scurfed since adoption of valves.
4. They require no attention whatever, as we have not touched them since putting up.
5. The economy of your system is so great, and the evils it removes so many, that I would not return to the antiquated "dip" upon any consideration, and strongly recommend your method to the gas world.
Yours respectfully,
E. OWEN, Engineer.

NOTE.—Other testimony to follow. Illustrated pamphlet descriptive of the system sent post free for 6½d. in stamps, on application to the Inventor and Patentee as above.

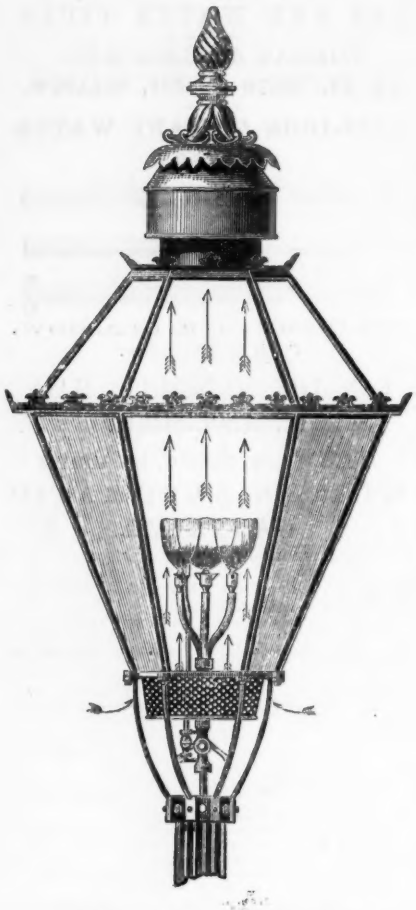
ECONOMY IN THE PRODUCTION OF GAS.
PLUTONIC CEMENT,
FOR JOINTING AND REPAIRING RETORTS AND OVENS *in* ACTION AND *out* OF ACTION.
Pamphlet on the advantages of the above, with Modes of Application, References, Prices, &c., free by post, from the Sole Manufacturer,
WILLIAM RICHARDSON, Gas and Hydraulic Engineer, CHARLES HENRY STREET, and BISSELL STREET, BIRMINGHAM.



ILLUSTRATED CATALOGUE,
OF FAMILY GAS KITCHENERS,
COOKERS, HOT-PLATES, STOVES, BATH-BOILERS, &c; SENT FREE.
ADAMAS WORKS, ISLINGTON, LONDON. N.,
WAREHOUSE: 74, STRAND, W.C.

BRAY'S

PATENT LANTERN AND FLAT-FLAME BURNERS.



80-CANDLES POWER. Scale 1 inch to foot. To be Lighted by ordinary Torch, or one Flash Jet. Arrows show direction of regulated Column of Air.

The understated declaration with which we introduced our apparatus has been fully borne out by general experience—namely, that

"THE FLAT-FLAME IS THE ONLY PRACTICABLE SYSTEM FOR STREET LIGHTING; and, 'in actual use,' yields as much light with Common Gas, and more with Cannel Gas, than any Argand System."

BIRMINGHAM LAMP TESTS

AFTER the most exhaustive series of experiments, extending over more than twelve months, with the most extensive assortment of Burners and Lanterns of large lighting power ever brought together, the Birmingham Authorities have

ADOPTED BRAY'S SYSTEM

for their Street-Lighting Improvements, for which purpose Sixty-Five 100-candle power Lanterns of medium lighting power are immediately required.

The apparatus used in the above tests were all of our usual medium lighting power class, and the tests showed that we sacrifice a considerable amount of lighting power for the sake of general efficiency. The tests further showed that our 80*-candle* HIGHEST *lighting power burner yielded* 3·51 *candles per foot of gas (the quality being* 16·75—3·35 *per foot—by the standard), which was a higher result than that yielded by any other flat-flame burner, and higher than the* 80*-candle power Argands.*

NOTE.—The above is the most conclusive answer to certain misleading statements which are being made by a prominent defeated competitor.

Extract from the *Leeds Mercury*, April 1, 1880.

At the meeting of the Leeds Town Council, March 31, Alderman Gaunt moved that the Council approve of the acceptance by the Corporate Property Committee of the tender of Messrs. Geo. Bray and Co. for the supply of 21 new lamps, to be placed upon the pillars round the Town Hall. The Committee had tested Sugg's and other lamps, and found Messrs. Bray's the best. It was intended to have two 200-candles power and two 100-candles power, and 17 round the hall of 80-candles power. Mr. Lynd, in seconding the motion, said that he had had an opportunity of seeing different lamps tested at Birmingham, and he was in favour of Messrs. Bray's.

Extract from the *Daily Free Press*, Aberdeen, Jan. 1, 1880.

Judging of the merits of the lights as they appeared last night, on-lookers seemed to be generally of opinion that between Sugg's patent and Bray's larger light at the corner of Union Buildings, Castle Street, there was no perceptible difference in the illuminating power. When the vital question of gas consumption is taken into account, it is found that in the Castle Street lamps there is a marked difference in the quantity of gas consumed, for while 30 feet of gas are hourly burned in Sugg's Patent Lamp, only 20 feet are used by Bray's Lamp during the same period.

[**The above Lamps have Meters attached.**]

Bray's Lanterns have been adopted by the Vestry of St. George, Hanover Square, London, for all the crossings and refuges of that important district, after a direct competition with the Argand system of lighting; and also by about 50 Towns and Vestries, after a similar competition in most cases.

GEORGE BRAY & CO., BLACKMAN LANE, LEEDS.

HONOURABLE MENTION.

PARIS EXHIBITION, 1878.

J. E. WILLIAMS & CO.,

SOLE MANUFACTURERS OF THE

SPECIAL METALLIC OXIDE PAINT,

Largely used by Gas Companies, Corporations, Railway Companies, Ironfounders, and Machinists.

HONOURABLE MENTION.

PARIS EXHIBITION, 1878.

It has the following qualifications and properties:—

Effectually prevents and arrests corrosion.
Has a fine gloss, and is very durable.
Does not require driers like other paints.
Protects iron from action of water.

Is not affected by sulphuretted hydrogen.
Forms a very hard, tough (not brittle) surface.
Will not crack, blister, or scale.
Is not affected by extremes of temperature.

Covers nearly double the area of other paints. (7 gallons or 1 cwt. will cover 1211 square yards of ironwork.)
Is cheaper and more economical than any other.

VICTORIA PAINT WORKS, COLLYHURST, MANCHESTER.

WARNER'S RETORT-HOUSE MACHINERY.

[*As Illustrated and Described in the* JOURNAL *for May* 4.]

Communications to be addressed to

W. J. WARNER, GAS-WORKS, SOUTH SHIELDS.

COMPTOIR GÉNÉRAL D'USINES À GAZ ET CONDUITES D'EAUX.

Offices: 55, RUE CONDORCET, PARIS.

The Comptoir Général of Gas and Water Works is authorized by a leading Company to **Buy Gas and Water Works and Concessions.**

The Comptoir Général is established for the **Buying and Selling of Works and Concessions.**

The Comptoir Général guarantees Capital for *bonâ fide* Undertakings.

The Comptoir Général undertakes the **Formation of Companies in France.**

The Comptoir Général undertakes the **Formation of Companies in England.**

M. L. MOSER DULFUS, the Proprietor of the **Comptoir Général,** has had Twenty years experience in financial affairs, and has a large and influential connection in England, France, and on the Continent.

No Commission or Expenses whatever are charged unless success is secured.

Le Directeur-Gérant,

55, Rue Condorcet, Paris. **Bn. L. MOSER DULFUS.**

IMPROVED COMPENSATING GAS-METER.

HUNT'S PATENT.

This Meter supplies a want long felt, by putting an end to the loss sustained by Gas Companies through the overworking of their Meters.

These Meters can now be supplied in either TIN-PLATE or CAST-IRON CASES, and OLD METERS converted to this plan. GAS COMPANIES and CORPORATIONS will find it to THEIR ADVANTAGE to adopt these Meters.

EXTRACTS FROM REPORTS.

"I am able to report that the Meters have given in each test most satisfactory results."—*Mr. H. Sporne, City of London Meter Inspector.*

"I consider the arrangement is a great improvement upon the Meters in present general use."—*Mr. T. Jackson, Meter Inspector, Birmingham.*

"I would observe from the results of my testings that the Meters are a great improvement on the ordinary Wet Meters in general use."—*Mr. H. Airey, Meter Inspector to the Metropolitan Board of Works.*

COPIES OF REPORTS SENT ON APPLICATION.

MANUFACTURED BY

JOHN BENT & SON,

WET AND DRY GAS-METER AND GAS APPARATUS MANUFACTURERS,

BELL BARN ROAD, BIRMINGHAM.

Established 1830.

THE MANN & WALKERS' PATENT SCRUBBER.

Extensive use.

The successful and extensive use of the Mann and Walkers' Patent Scrubbers in all parts of the world has demonstrated their advantages, and entitled them to be received with credit and confidence. The number of them in use is about twenty times that of any other known means of purifying gas from ammonia.

Small quantity of Water required.

By a very small quantity of clean water (not more than 5 or 6 gallons per ton of coals carbonized) the whole of the Ammonia contained in the Gas is completely absorbed; the Gas, after only once passing through, issuing from the Scrubber outlet completely purified from Ammonia. The Scrubber gives no appreciable back pressure.

Residual Product obtained.

The Residual Product—namely, the Ammoniacal Liquor—is obtained at from 20 to 30 ounces commercial strength, which enables it, after being mixed with the weaker Liquor from the hydraulic main and condensers, to be sold to the Manufacturing Chemists, or converted into Sulphate, at the degree of strength found most profitable to the Gas Company.

Illaminating power increased.

The Scrubber is a Saturator, and the Gas being soaked in this strong solution of Ammonia in the lower columns of the Scrubber, is purified from a large amount of Carbonic Acid, and its Illuminating Power is thereby increased.

Small amount of power required.

The friction is so little, and the motion so slow, that the power necessary to work the Scrubber is almost inappreciable. A small gas-engine will work a pair of Scrubbers, purifying 2 million cubic feet of gas per day.

Beckton Gas-Works.

There are thirty of these Patent Scrubbers in the Beckton Gas-Works, equal to purifying 30 million cubic feet per day, and the total amount of engine power necessary to work the whole 30 is not equal to that given out by one 10-horse engine.

Reserve purifying power contained.

There is also a most important advantage arising from the height of these Scrubbers, in the reserve force contained in them. In the event of any stoppage, the mass of soaked and wetted material would continue the purification for hours, even if the supply of water and working were stopped from any cause.

Internal Materials not changed.

The changing of the soaking materials in these Scrubbers is very seldom required; they are well known to remain in action for seven years without being emptied.

Guarantee.

They are in all cases erected under guarantees; they easily fulfil the stipulations of any Act of Parliament, and the chemical restrictions of the Board of Trade; and in cost they are much less to a Gas Company than any other known means of purifying Gas from Ammonia.

C. & W. WALKER.

8, *Finsbury Circus, London, E.C.*

F. & C. OSLER,

45, OXFORD STREET, LONDON, W.

MANUFACTORY AND SHOW-ROOMS:

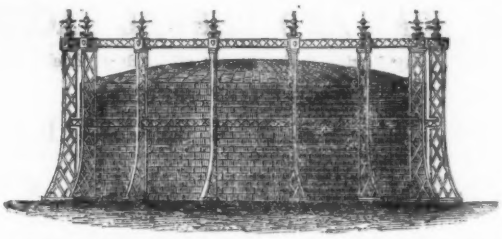
BROAD STREET, BIRMINGHAM.

ESTABLISHED 1807.

MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS, WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES.

TABLE GLASS OF ALL KINDS.

CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.



THE HORSELEY COMPANY,

LIMITED,

TIPTON, STAFFORDSHIRE.

LONDON OFFICE:

6, WESTMINSTER CHAMBERS, VICTORIA STREET,

GAS ENGINEERS, IRONFOUNDERS, &c.,

MANUFACTURERS OF

GASHOLDERS, WROUGHT AND CAST IRON TANKS, CONDENSERS, PURIFIERS, SCRUBBERS, MAINS, RETORT-LIDS, PLAIN AND DISHED, LAMP-POSTS, PIPES,

AND ALL REQUISITES FOR EITHER

GAS OR WATER WORKS;

ALSO

MAKERS OF ROOFS, BRIDGES, &c.

S. OWENS & CO.,

HYDRAULIC, GAS, AND GENERAL ENGINEERS,

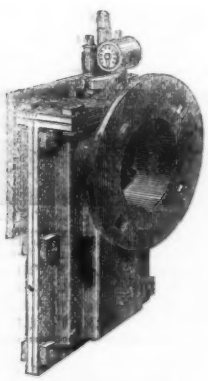
WHITEFRIARS STREET, LONDON, E.C.

Sole Manufacturers of MANN & OWENS'

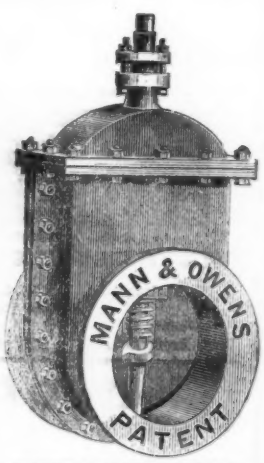
PATENT SCREW & CAM GAS-VALVE,

Protected by Royal Letters Patent in England, France, Belgium, & the United States of America.

VALVE to OPEN DOWNWARDS.



BRIDGE-VALVE for Regulating the Seal of Hydraulic Mains.



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The SPECIAL ADVANTAGES of MANN AND OWENS' PATENT VALVE are as follows:—

1. Its non-liability to become set fast through varying temperature or from the deposit from crude gas. 2. It is made absolutely gas-tight by the simple action of a screw and cam. 3. Inconvenience through the breakage of springs or wedges setting fast cannot arise. 4. The face of the Valve is scraped and cleaned of any solid matter at each operation of opening or closing.

The Valve can be had to work either in a Vertical or Horizontal position.

Every Valve is carefully tested under pressure, and warranted perfectly sound and gas-tight.

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State whether required for above or below ground, if Double Flange or Socket and Spigot Valves are wanted, or with loose Flanged Socket and Spigot pieces.

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Also makers of PILLAR-VALVES, SELF-ACTING BYE-PASS VALVES, OUTSIDE RACK AND PINION VALVES, HYDRAULIC-MAIN VALVES, DISC-VALVES, &c.

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PROPRIETORS OF THE

BEST STOURBRIDGE CLAYS,

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Manufacturers of all Descriptions of

BEST STOURBRIDGE FIRE-BRICKS, LUMPS, AND CLAY RETORTS

Of all Dimensions for Gas-Works,

GLASS-HOUSE POTS & CRUCIBLES

ESTABLISHED 1836.

The Highest Award was obtained by H. & M., at the Philadelphia Exhibition, 1876, for Superior Quality of Manufacture. SILVER MEDAL, PARIS, 1878.

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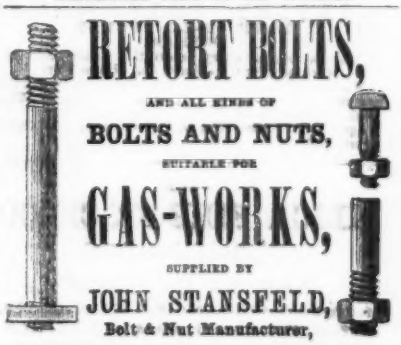
GENERAL STEEL AND IRON TOOLS AND MATERIAL USED IN GAS-WORKS.



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HARTHILL CANNEL

Yields 14,920 cubic feet of 40·92-candle gas per ton.

THRASHBUSH CANNEL

12,530 cubic feet of 40·22-candle gas per ton, and 9 cwts. of good coke.

LOTHIAN'S CANNEL

Yields 12,500 cubic feet of 34-candle gas per ton, and 9 cwts. of excellent coke, containing only 4 per cent. of ash.

MUIRKIRK, No. 1, CANNEL

Yields 12,160 cubic feet of 32·5-candle gas per ton, and 10 cwts. of excellent coke, containing only 3 per cent. of ash. This cannel is almost free from sulphur.

OLD WEMYSS CANNEL

Yields 13,320 cubic feet of 32·5-candle gas per ton.

Prices and full analyses on application at above address, or from WEDDERSPOON, FERGUSSON AND Co., 21, Lime Street, LONDON, E.C.

HEBBURN MAIN GAS COAL.

This Coal is now highly approved of for gas making, and yields over 10,000 feet per ton of 15-candle gas, and about 14 cwt. coke.

For references and prices, either f. o. b. or by rail, apply to

W. RICHARDSON,

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THE MIRFIELD COAL COMPANY are supplying GAS COAL of the best quality on trucks at their siding. This Coal contains 10 per cent. of Cannel, and, as analyzed by Mr. James Paterson, of Warrington, yields 12,600 *cubic feet of* 16·67-*candle gas, with* 1430 *lbs. of good Coke, per ton.* Ash in Coke, 1·85.

Apply to the MIRFIELD COLLIERY, Mirfield, NORMANTON. London Agent: Mr. F. J. LEE SMITH, 38 THROGMORTON ST.

WANTED, by Samuel Thompson & Co., Colliery Office, Lancaster, APPLICATION for PRICES from Gas Managers who are prepared to receive Tenders for GAS COAL or CANNEL.

John Leigh, Esq., M.R.C.S., F.C.S., &c., &c., in his analytical report of S. T. & Co.'s Coal, says: "It is remarkable for its purity, I have scarcely ever examined a Coal containing so small a quantity of ash, and when Cannel of the best description is scarce, it may well replace this material."

GAS COAL.

POPE & PEARSON, LIMITED, have now the authority of several of the most eminent Gas Engineers of London in stating that their Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles;* or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17½ candles.

One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

For further particulars, apply to POPE AND PEARSON, LIMITED, West Riding and Silkstone Collieries, near LEEDS.

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THE Tawd Vale Colliery Company, Limited, are prepared to Contract for the Supply of their superior Arley and other GAS COALS, and to send samples to the order of Gas Engineers and others, or complete Analysis, on application. Shipped at Liverpool, Preston, Fleetwood, Garston, or Birkenhead.

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Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.

Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

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Manufacturers of THE ORIGINAL SILICA OR DINAS FIRE-BRICKS. Specially adapted for Gas-Retort Furnaces and for Siemens's Gas-Furnaces. Shipments promptly executed to London, Liverpool, Hull, Grimsby, &c.

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Supply to any Railway Station or for Export all kinds of Fuel for Gas purposes.

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For Gas, Steam, and Water; also Black Galvanized and Enamelled.

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FUEL-MACHINE, for Compressing Breeze and Tar.

N.B.—Pamphlet, with Twenty-Eight Illustrations and Letterpress, on the Construction of Gas-Works, will be sent, post free, on receipt of 4s. in stamps To be had of the AUTHOR; or at the Office of the "JOURNAL OF GAS LIGHTING."

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The Aldwarke Main Brights is a first-class gas-making and coking Coal, yielding by analysis 12,600 feet of 19-candle gas per ton, and giving "Weight of illuminating matter in lbs. of sperm, 820·80." It is very free from impurities and foreign matter.

Copies of Analyses made by Gas Companies who have used it will be forwarded and Samples sent on application.

THE LOCHORE & CAPLEDRAE CANNEL COAL COMPANY, Limited,

Beg to intimate that the development of their Mines is progressing favourably, and that they are now in a position to supply their famous Cannels.

Quotations and full Analyses will be supplied on application addressed to the Company,

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Abstract of Analyses made by Dr. WALLACE, Gas Analyst for the City of Glasgow.

	Cubic Feet per Ton.		Illuminating Power.		Equivalent of a Ton in Sperm.
Plesio Boghead	13,165	....	36·16	....	1632
Brown Capledrae	12,210	....	38·46	....	1610

MESSRS. FLETCHER, BURROWS, & CO.,

ATHERTON COLLIERIES, near MANCHESTER,

ARE PREPARED TO MAKE CONTRACTS FOR THE SUPPLY OF

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WHICH ARE OF ACKNOWLEDGED EXCELLENCE.

Their Coal is in use in the Salford, Stafford, Bolton, and other large Gas-Works in England, Ireland, Wales, and Abroad, giving in practical working 10,300 feet of 17-candle Gas, and 15 cwt. of superior Coke per Ton of Coal.

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HOYLAND SILKSTONE COLLIERIES,

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This Company is now in a position to raise **2000 tons per day of REAL OLD SILKSTONE GAS COAL.**

"The quality of this Coal for Gas purposes, if equalled, is not excelled by any on record, and the Coke competes successfully with best Durham."—See *Mining Journal*, Aug. 11, 1877.

Prices quoted to any Railway Station, or F.O.B. Hull, Grimsby, Goole, Keadby, Liverpool, and Fleetwood.

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REAL OLD SILKSTONE GAS COAL.

C. A. HAWORTH & COY.,

STANHOPE SILKSTONE COLLIERIES,

SILKSTONE, NEAR BARNSLEY,

Are prepared to supply their celebrated **Real** Old Silkstone Gas Coal and Nuts. Prices quoted to any Railway Station, or f.o.b., Hull, Goole, Keadby, Grimsby, Liverpool, and Fleetwood. Every information given on application to above address, or to their Agent,

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BEST WIGAN ARLEY GAS COAL.

Yielding (as per analysis) 11,970 cubic feet of 16·39 candle gas per ton. Copies of analyses and testimonials from **Gas Companies and Managers,** who have used the Coal in large quantities for several years, will be forwarded on application.

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CIRCULAR TO GAS COMPANIES AND OTHERS.

Stourbridge, Jan., 1880.

DEAR SIRS,—As the time for ordering stock for your general requirements for this year is approaching, we beg to call your attention to the various articles of our manufacture, and to solicit your early commands.

Fire-Clay Gas-Retorts.—As some of our friends appear to prefer these *machine made*, we have arranged to supply machine-made Retorts at same price as hand-made ones. At the same time, although it is to our advantage to supply machine-made, we do not recommend them, for the reason stated to you in our Circular of November, 1878. We have a very large stock of Retorts, all in good condition, and of such an assortment that we could supply any size on receipt of order.

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Staffordshire Blue Bricks and Paving Bricks.—We shall be glad to submit prices and samples of these on hearing from you, with specification, and we venture to say our brand in these goods is unsurpassed. Hard Blue Paving Quarries make the best kind of Pavement for Retort-Houses, &c.

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Lime, Cement, Plaster of Paris.—Our Lime Kilns at Brettell Lane are now in full operation, and we are in a position to supply any quantity of pure Lime manufactured only from the Earl of Dudley's best Limestone Beds. Our Cements and Plaster of Paris will withstand any required test.

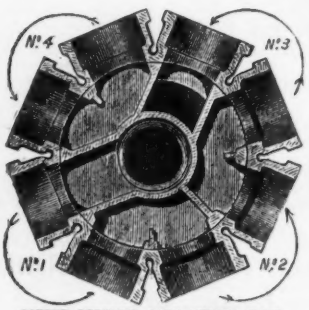
References and Testimonials.—We can furnish you with any number of these; and may mention that during the last thirty-five years we supplied most of the Gas-Works in the United Kingdom and Abroad, and that we have held contracts from Her Majesty's Government for more than Twenty years consecutively.

Awaiting your esteemed favours,

We remain, Dear Sirs, your obedient servants,

HARRIS & PEARSON.

Note.—We shall be pleased to furnish Drawings and Specifications, if desired, and shall be most happy to see you or any of your Engineers here at any time; or, if you would like to see any of our representatives or ourselves at your Works, shall be glad to wait upon you by appointment.



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Sectional Plan.

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Constructed on the principle of the ordinary Plug-Cock.

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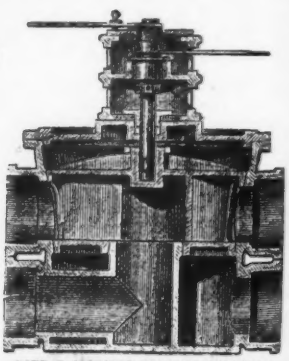

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Invite the attention of Gas Companies, Corporations, and others to their

PATENT STREET LAMPS,

Which are so constructed that neither putty nor other materials are required to secure the glass. No hacking out of old putty, which frequently destroys the frames. A new pane of glass can be inserted in two or three minutes by any inexperienced person, the glass being secured by a hinged flap and turn button.

PRICE, with Opaline Reflecting Top, 12s.; with Fluted Glass Top, 10s. 6d.
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D. HULETT'S IMPROVED SERVICE CLEANSER,

By the use of which stoppages in service and other pipes are freed from naphthaline and other obstructions in a few minutes. PRICE 73s. net.

HULETT'S PATENT MERCURIAL REGULATOR,

For inserting in mains, to prevent the excess of pressure in high ground, or other elevated positions.

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